ADVERTISING PAGES REMOVED

STEEL

ESTABLISHED 1882

Contents

Volume 106—No. 22 **May 27, 1940**

READERS COMMENTS 4

AS THE EDITOR VIEWS THE NEWS 19

NEWS

- Steel Institute Moves To Aid Defense Program 21
- F. D., a Laggard in Defense, While Provoking Bad Foreign Relations 23
- "Crazy Quilt of Steel Mill Extras" Discussed at Warehouse Meeting 25
- Gear Makers Pledge Support to Government's Armament Plan 27
- Steelworks Operations for Week 29
- Aviation 33
- War Requirements Increasingly Divert Canada's Steel Output 38
- Metal Trades Group Stresses Need for Operator Training Programs 39
- Analysis of Iron and Steel Products for First Quarter 40
- Men of Industry 41
- Obituaries 43
- Analysis of 1939 Steel Production 44

WINDOWS OF WASHINGTON 30

MIRRORS OF MOTORDOM 35

EDITORIAL—Manufacturers Are Puzzled 46

THE BUSINESS TREND 47

TECHNICAL

- Steel Switchgear 52
- Automatic Bender Produces Rifle Part at Rate of 2000 Per Day 56

Machining

- Die Making in the Modern Manner 50
- Machining Hard Alloy Steels 74

Progress in Steelmaking

- Steel Powder for Iron 54
- Tailored Firebrick Permit Exact Circumferential Dimensions 58
- Between Heats with Shorty 62
- Lower Shell of J & L Eliza Stack Replaced with Little Trouble 63

Heat Treating

- Firing System Has Wide Temperature Range 64

Materials Handling

- Dust-Tight Conveyors Help Keep Boiler Room Spotless 55
- Simple Handling Facilities in Press Work Eliminate Hazards 66

Joining and Welding

- Electric Welded Chain 70

INDUSTRIAL EQUIPMENT 76

HELPFUL LITERATURE 81

MARKET REPORTS AND PRICES 83

BEHIND THE SCENES 102

CONSTRUCTION AND ENTERPRISE 104

INDEX TO ADVERTISERS 112

EDITORIAL STAFF

E. L. SHANER
Editor-in-Chief

E. C. KREUTZBERG
Editor

A. J. HAIN
Managing Editor

E. F. ROSS
Engineering Editor

GUY HUBBARD
Machine Tool Editor

D. S. CADOT
Art Editor

ASSOCIATE EDITORS

G. H. MANLOVE — J. D. KNOX
W. G. GUDE — G. W. BIRDSALL
W. J. CAMPBELL
New York
I. H. SUCH — B. K. PRICE
L. E. BROWNE
Pittsburgh — *Chicago*
R. L. HARTFORD — J. F. POWELL
Detroit — *Washington*
A. H. ALLEN — L. M. LAMM
London
VINCENT DELPORT

ASSISTANT EDITORS

A. R. FINLEY — JAY DEEULIS
J. C. SULLIVAN — LA VERNE NOCK
GEORGE URBAN
New York
JOHN H. CALDWELL

BUSINESS STAFF

G. O. HAYS
Business Manager
C. H. BAILEY
Advertising Service
New York ..... E. W. KREUTZBERG
B. C. SNELL
Pittsburgh ..... S. H. JASPER
Chicago ..... L. C. PELOTT
Cleveland ..... R. C. JAENKE
D. C. KIEFER
J. W. ZUBER
Circulation Manager

MAIN OFFICE

Penton Building, Cleveland

BRANCH OFFICES

New York ..... 110 East 42nd St.
Chicago ..... 520 North Michigan Ave.
Pittsburgh ..... Koppers Building
Detroit ..... 6560 Cass Ave.
Washington ..... National Press Building
Cincinnati ..... 1734 Carew Tower
San Francisco ..... 1100 Norwood Ave.
Oakland, Calif., Tel. Glencourt 7559
London ..... Caxton House
Westminster, S.W. 1

• ● •

Published by THE PENTON PUBLISHING CO., Penton Building, Cleveland, Ohio. JOHN A. PENTON, Chairman of Board; E. L. SHANER, President and Treasurer; G. O. HAYS, Vice President; F. G. STEINEBACH, Secretary.

Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers' Association

Published every Monday. Subscription in the United States, Cuba, Mexico and Canada, one year $4, two years $6; European and foreign countries, one year $10. Single copies (current issues) 25c.

Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879. Copyright 1940 by the Penton Publishing Co

PRODUCTION • PROCESSING • DISTRIBUTION • USE

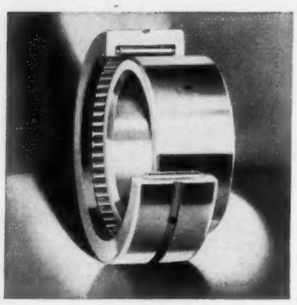
"With the Greatest of Ease"

PLATENS IN ~~Federal~~ WELDERS SLIDE ON BANTAM BEARINGS

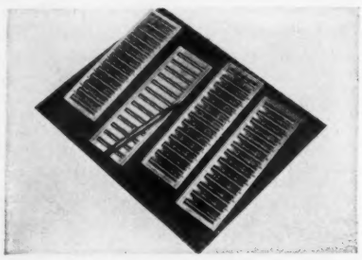
In this unit, specially designed by The Federal Machine and Welder Company for flash welding of non-ferrous alloys, the entire mechanism that clamps the work moves forward 200 times an hour. Mass of metal is heavy, and movement must be as free from friction as possible. Bantam engineers designed special reciprocating ball bearings for this unusual application—and Federal reports ideal results.

Typical of Bantam's ability to meet out-of-the-ordinary requirements, reciprocating ball bearings have many uses in applications where rotation must be combined with reciprocation. And they are only one of the many types of custom-built bearings which experienced Bantam engineers are ready to design to fit your special needs. For successful solution of your toughest bearing problems, TURN TO BANTAM.

BANTAM BEARINGS CORPORATION • SOUTH BEND, INDIANA



(*Left*) **BANTAM'S QUILL BEARING** is admirably adapted for handling heavy loads in a limited space. It is easily mounted, low in cost. For further information write for Bulletin B-104. For Needle Bearings to be used in lighter service, write our affiliate, The Torrington Company, Torrington, Conn., and ask for Circular 21-H.



(*Right*) **LADDER TYPE BEARINGS,** also used on Federal Welders, are specially designed by Bantam for applications where friction must be held to a minimum in service involving reciprocating motion.

BANTAM'S ENGINEERING COUNSEL is unbiased and authoritative. Bantam makes all types of anti-friction bearings—straight roller, tapered roller, needle, and ball. Bantam engineers recommend the type that best meets *your* requirements.

BANTAM BEARINGS

STRAIGHT ROLLER • TAPERED ROLLER • NEEDLE • BALL

STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views The News

■ EUROPE'S war continues to influence business here in various respects. Steel ingot output (p. 29) last week jumped 5 points to 75 per cent, stimulated both directly and indirectly by developments abroad. First official move by the steel industry to co-operate in the government's defense program was taken by the American Iron and Steel institute last week (p. 21) when it elected Walter S. Tower, recently executive secretary, as full-time president in anticipation of extra duties that will be faced by the institute and member company heads. . . . Need for training machine operators to meet defense demands was stressed (p. 39) at the annual convention of the National Metal Trades association.

• • •

Further upturn in steelmaking is imminent (p. 83) as both export and domestic demand continues to increase. The latter is being stimulated by prospects for delayed mill deliveries this summer. Foreign purchases last week included 70,000 tons of shell steel for England and France. Pig iron buying has increased sharply here, while scrap prices have advanced to the highest level since last December. Industrial and residential work is outstanding in building contruction gains. Outlook for a revival in railroad equipment building is more favorable. . . . Building of 50,000 airplanes (p. 33) would require only about 180,000 tons of steel.

Steel Trend Is Upward

• • •

The administration has failed to provide proper national defense despite huge expenditures, the American Iron and Steel institute (p. 23) was told last week by E. T. Weir, retiring president. Although pointing out the need for defense measures, Mr. Weir voiced opposition to entanglement in the European war. . . . Steel distributors view various mill extras as a "crazy quilt," it was declared at last week's annual meeting (p. 25) of the American Steel Warehouse association. . . . Much loose thinking is current (p. 35) regarding influence of defense spending. . . .Seventy-fifth anniversary of rolling of the first steel rail in the United States (p. 38) will be celebrated June 10 at Chicago.

Hits U. S. Defenses

• • •

With war restricting supply of Swedish iron powder, research discovers source of steel powder (p. 54) possessing superior properties. . . . Automatic bending, followed by electrical resistance stress relieving, of a tubular part (p. 56) is speeding production of an army rifle. . . . Changing conditions as regards production of dies, tools, jigs and fixtures has brought independent specialists in this work into prominence (p. 50). . . . Electric welded, forged hoist chain (p. 70) is assured high strength by close control of fabricating operations, heat treatment and prestretching. . . . Ability to machine alloy steels of exceptional hardness (p. 74) is making it profitable to use these steels for high-strength, light-weight applications.

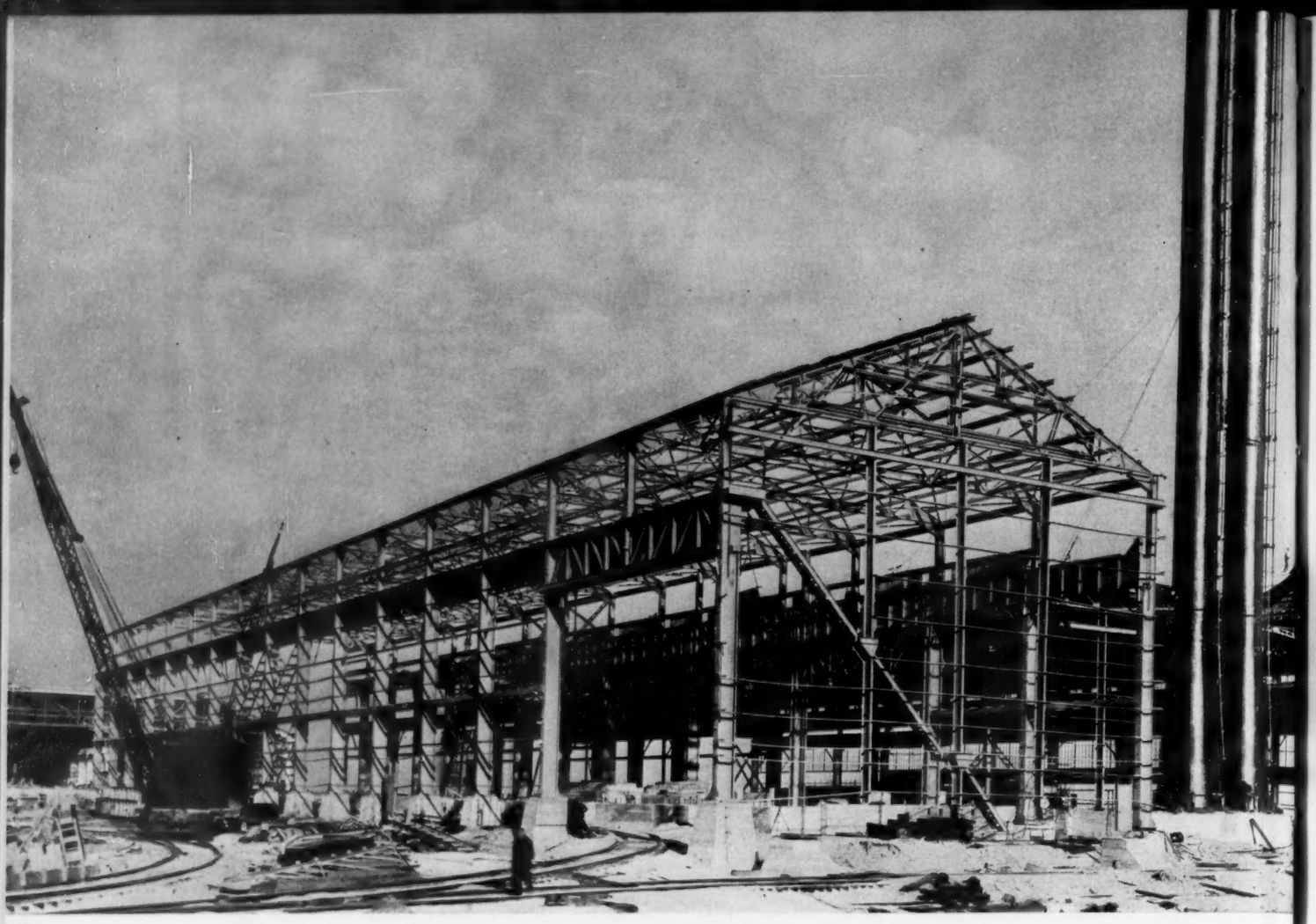
Steel Powder Developed

• • •

Development of a new series of firebrick shapes (p. 58) makes it possible to lay up arches, domes and various circular structures with exactness heretofore unattainable. . . . Lower shell of a Pittsburgh blast furnace undergoes replacement (p. 63) without disturbing its upper structure. . . . New method of firing (p. 64) permits gas convection-type heat treating furnaces to operate through a temperature range of 600 to 2000 degrees Fahr., increasing flexibility. . . . Economies and safety which can be achieved through mechanical handling facilities for power presses are well illustrated by a recent installation (p. 66) which doubles production. . . . Possessing definite advantages, steel is used more widely for electrical switchgear (p. 52).

Refractory Shapes New

E C Kreutzberg



An Opportunity for Fabricators to *Increase* Sales!

Manufacturers of machine tools long ago adopted the sound selling practice of proving to their customers that machine tools of new designs make better products at lower costs. The reward for these alert and untiring sales efforts has been a vastly greater volume of machine tool orders.

Fabricators of structural steel can take that page from the machine tool industry's "success book." Never before have fabricators had so many good arguments, including low interest rates, with which to get new business. Thousands of manufacturing plants are doing business in buildings which are a handicap to efficient manufacturing. Today the industrial architect, contractor and fabricator do far more than simply build. They can make structures that are really "tools" for manufacturing, tools that will give the manufacturer a valuable advantage in lowered costs and higher profits.

Yet, thousands of manufacturers are not fully aware of these facts. Many are struggling along in outmoded structures that are a definite business handicap. Fabricators who will step out and sell structures in which better products can be made at lower cost will open a new realm of opportunity. Inland engineers are especially equipped by many years of practical experience to give fabricators valuable engineering assistance. It is free for the asking.

INLAND STEEL CO.
38 S. Dearborn Street, Chicago
Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati

SHEETS • STRIP • TIN PLATE • BARS • PLATES • FLOOR PLATES
STRUCTURALS • PILING • RAILS • TRACK ACCESSORIES
REINFORCING BARS

use..

INLAND STRUCTURAL STEEL

Steel Institute Moves To Aid Defense Program

Industry gears itself to handle requirements of program and offer government full co-operation. Elect full-time president in anticipation of extra demands on chief executive's time. Spokesmen at forty-ninth general meeting reiterate opposition to United States' entanglement in foreign wars

■ PROBLEMS that will confront industry as result of the war in Europe and our domestic defense program held the spotlight at the forty-ninth general meeting of the American Iron and Steel institute at the Waldorf-Astoria hotel, New York, May 23. About 1000 attended.

The institute itself moved to gear the industry for full co-operation with the defense program by electing Walter S. Tower, executive secretary since 1933, as president, chief executive officer and a director. Mr. Tower succeeds E. T. Weir, chairman, National Steel Corp., Pittsburgh, who has served as president for the past year.

In naming Mr. Tower, the directors adopted a policy of electing a paid president. During the past seven years executives of member companies have served as heads of the institute. In that period, presidents in addition to Mr. Weir have been E. G. Grace, president, Bethlehem Steel Co., Bethlehem, Pa., and T. M. Girdler, chairman, Republic Steel Corp., Cleveland.

The election of a paid president of the institute, who will devote all his time to its affairs, is regarded as the first official move by the industry in gearing itself to be in a position to co-operate in the fullest measure in the government's huge national defense program.

The development of that program is expected to place heavy demands upon the time of the chief executive of the institute in dealing with problems of the industry and of relationships with other industries and with the government. Moreover the time and energy of each executive of the member companies will be fully occupied in their respective production problems. For that reason none of them would be able to find the time to guide the industry as president of the institute.

Mr. Tower has been associated with the steel industry since 1919 except for three years after the war when he was commercial attache for the United States department of commerce at the American embassy in London.

His first association with the steel industry was with the Consolidated Steel Corp.; later he was associated with the Bethlehem Steel Co.

A fundamental change in the administration's attitude toward industry is the first essential in the country's huge defense program, declared Mr. Weir in his presidential address (For abstract see p. 23).

Hold Labor Forum

An innovation at the meeting was an industrial relations session held under the chairmanship of George T. Fonda, assistant to the president, Weirton Steel Co., Weirton, W. Va. This comprised a panel discussion of questions on labor and industrial relations.

Members of the panel included: E. F. Blank, Jones & Laughlin Steel Corp., Pittsburgh; R. C. Cooper, Wheeling Steel Corp., Wheeling, W. Va.; L. S. Harding, Crucible Steel Co. of America, New York; J. M. Larkin, Bethlehem Steel Co., Bethlehem, Pa.; J. E. Laughlin Jr., Thorp, Bostwick, Reed & Armstrong, Pittsburgh; C. A. McLain, Cravath, de Gersdorff, Swaine & Wood, New York; C. H. Murray, American Rolling Mill Co., Middletown, O.; T. F. Patton, Republic Steel Corp., Cleveland; J. A. Stephens, United States Steel Corp., New York; J. A. Voss, Republic Steel Corp., Cleveland.

The industrial relations forum was an off-the-record session.

Edward L. Ryerson Jr., chairman, Inland Steel Co., Chicago, urged a more intelligent competitive sales policy. Speaking as a former buyer of steel and as a present producer, Mr. Ryerson declared there never has been any doubt about the active competitive nature of steel selling policies but that he had not found the competition as intelligent as it was keen.

A fair price based upon a reasonable profit must be the keynote of steel sales, said Mr. Ryerson.

"In recent times we seem to have developed a retail store sales policy of offering great spring and fall bargain sales to stimulate trade, in spite of the fact that as far as I can learn we have never maintained a habit in the steel industry of building up large mill inventories of finished goods that call for quick or distress liquidation."

Mr. Ryerson added that "if we persist in these so-called 'bargain sales' of our products it seems to me that before long we will have 'bargain sales' of our plants." Speaking from his experience as both a buyer and producer of steel, he stoutly defended the basing point system of pricing and said that the industry was indebted to United States Steel Corp. officials "for their comprehensive presentation of this difficult question at the temporary national economic committee hearings."

Mr. Ryerson also warned the steel

industry that it was time for the industry to publicize just what "extras" mean.

"The public generally and even many of our friendly customers have the opinion that extras are 'gravy,' added to the base price for no reason whatsoever but for increased profit and that this is a clever method the steel industry uses to hide its real price."

"It is time," Mr. Ryerson declared, "we publicize the fact widely that this industry makes thousands of products and that only through a system of base prices and extras can we avoid having thousands of prices. We must somehow or other convince everyone who talks about the steel industry that the extras added to our prices are added solely because they properly reflect added costs that are involved in the manufacture of the type of merchandise to which the extras apply. If we cannot convince them of this fact we had better develop an entirely new method of pricing steel products."

Commenting on the financial problems of the steel industry, Frank Purnell, president, Youngstown Sheet & Tube Co., Youngstown, O., advised the steelmakers to consider total cost instead of devoting so much attention to so-called manufacturing costs.

Earnings Have Dwindled

"Unless all necessary items of outgo such as selling, administrative and general expenses, depreciation, return on fixed interest bearing obligations, taxes, and the like, are kept in mind and included in all cost accounting there cannot be any very intelligent approach to a sound financial policy for any member of the industry."

Commenting on the poor rates of steel earnings in recent years, Mr. Purnell said:

"We must admit that for 30 years the return on invested capital in this industry has been steadily declining. In the decade, 1910 through 1919, the average annual return on its invested capital was 8 per cent. In the next decade, 1920 through 1929, it was 5½ per cent. In the decade closing with 1939, the average annual return on capital invested in the steel industry was 1.8 per cent.

"There are more than 500,000 shareholders in the various steel companies. In 1929 they received $202,193,000 in dividends. By 1933 their dividends had dwindled to $14,500,000, a decline of 93 per cent. In 1939 dividends increased to approximately $70,000,000 but even that total is a small return on the amount invested.

"New money, unless earned in the business, has to come in one of two forms—through the sale of shares or through the sale of bonds. If one considers an issue of preferred stock as creating a fixed obligation in the form of dividends, there is little difference in the financial problem presented by the sale of preferred stock and that presented by the sale of a bond issue.

"The equity risk in the steel industry has been unduly high because of inadequate earnings and for that reason the average steel company would find it difficult under present conditions to dispose of an issue of equity shares.

"In the four years, 1927 through 1930, new steel company common stock issues approximated $475,000,000. In the nine years that followed the total of such issues approximated only $18,000,000 and included several scattered offerings of relatively small amounts each. Equity shares, therefore, have been supplanted in financing new construction by overhead debt with its burden of fixed charges.

"In order to attract venturesome capital, there must be a definite improvement in earnings for the industry. We all know that during the past decade reduced volumes, increased costs and inadequate prices have hampered our industry and other industries in efforts to make reasonable earnings. The cost factor in production has been growing steadily more serious. Cost rigidities, such as taxes, freight rates and wages, have become more pronounced. The continuously increasing aggregate of these fixed burdens and their effects on profit margins have lessened the attractiveness of equity risks in the industry.

"Another increasingly important factor in the financial problems of industry is taxes. The tremendous government spending of recent years have made it necessary to find new sources of tax revenue, and the end is not yet. Such spending ultimately must be paid for out of earnings of the people and our tax burden will be much worse before it becomes lighter. Government spending at best is illusive; it does not create new enterprises or new products and the employment resulting from it is entirely temporary. It knows no such thing as turnover and reduces itself to the dole or construction in a short concentrated period of time of various public works, which should be built over a long period.

James E. Lose

Mr. Lose, vice president, Carnegie-Illinois Steel Corp., was awarded the institute's medal for 1939 in recognition of his paper, "Problems in the Manufacture and Use of Steel in the United States," delivered at the 1939 session.

Mr. Lose began his business career in 1910 with Carnegie Steel Co., and has been associated continuously with that company and its successor, Carnegie-Illinois Steel Corp. He started at Carrie Furnaces, Rankin, Pa., the blast furnace department of Homestead Steel Works, as a tracer in the drawing room and progressed to superintendent of blast furnaces.

He became general superintendent of Homestead works in 1930; three years later he was made vice president in charge of operations, Carnegie Steel Co., and retained that title with Carnegie-Illinois when the latter was organized in 1935.

Taxes Exceed Earnings

"As shown by a compilation of the institute, covering 89 steel companies, their total tax bill last year was $141,123,000 and their net earnings were $140,394,000. Of that tax bill, $89,000,000, or more than 60 per cent, were state and local taxes, representing a burden upon the companies which is fixed regardless of rates of operation or of earnings.

"The matter of rate of turnover of capital in the industry, as compared with other industries, also has a bearing upon the question of costs, prices and profits. The average capital turnover in the steel industry is about once in 24 months, as compared with once in 12 months for certain other major industries. The margin of profit, in terms of gross sales, naturally should be substantially more, where the rate of turnover is less frequent. A profit margin on gross sales adequate for a business turning its capital once a year, may be inadequate to enable the steel industry, with its slower turnover, to make a profit.

"The failure of the steel industry to recognize that basic fact and the necessity for a better percentage of profit margin, in terms of gross

(*Please turn to Page* 28)

F.D.. a Laggard in Defense. While Provoking Bad Foreign Relations

By E. T. WEIR

■ FOR the second time in the history of the Institute we hold our meeting while the world is at war. . . . To find anything approaching a parallel experience we must go back to the opening stages of the last World war when the German armies were making their headlong advance to the Marne.

So far, thank God, the American people are not disposed to regard this war as our war. It is plain that they are far from believing that American intervention can contribute anything more of lasting value now than it did in 1917. Despite overwhelming pro-Ally sympathy, despite the emotional impact of events in Poland, Finland and Norway, and even the invasion of Holland and Belgium, there is no indication that our public would sanction our participation. This commonsense attitude of rank and file America is our surest guaranty against involvement.

Last September, I was among those who spoke out against this country's doing anything that held the faintest possibility of entanglement in Europe's war. I am still just as firmly convinced that the United States has no place in that war. Only one reason can justify war for America—jeopardy to the integrity and independence of the United States or invasion of this hemisphere.

Only One Interest Is Paramount

It is now of extreme importance that we, and all Americans, recognize clearly that America has one paramount interest to which all others are secondary. That is the preservation of the American way of life here in America. . . .

Preservation of the American ideals of life involves adequate preparation for effective defense. Whatever the outcome of the present war, the ruthlessness of its instigators has impressed upon us the necessity of thorough preparation for defense. With our unlimited resources, industrial power, and natural advantages, it is inexcusable that we are not better prepared at this moment, if competent observers may be believed—and I, for one, think they may—this nation could be another Finland or Norway were it not for the barriers of ocean and distance.

Monroe Doctrine Works Both Ways

With all the warning we have had, why has the present administration failed so glaringly to discharge one of the most vital functions of federal government—the provision of proper national defense? For seven years, the administration has had at hand everything necessary for the building of real defenses. Billions have been appropriated for this purpose. What has been done with them? Why, after spending all this money, do our military and naval establishments lack modern weapons, equipment and material? Why have our armed forces not been trained in methods of modern warfare?

This delinquency can not be attributed to ignorance. For years, persons whose competence is not open to question have been pointing out the weakness of our national defense condition and urging corrective measures. A short time ago General Hugh Johnson wrote that in 1933 he tried to secure a program that would provide national defense and at the same time give employment and recovery. His effort failed. But in that same year, Harry Hopkins was given the bulk of a three billion, three hundred million dollar appropriation for—as the general says—raking leaves. Within the past year, men who knew from experience in the previous war how poorly the country was prepared from both military and industrial standpoints, urged that the administration take immediate and effective steps to build a real defense system. Again the administration did nothing.

And during these seven years, when the administration has been doing nothing to increase our defense facilities, it has been provoking bad foreign relations. In 1937, the President in his "Quarantine" speech in Chicago evidenced hostility to certain foreign powers, and he has been outspoken in his opinions regarding the European controversy.

He seems to have completely forgotten that the Monroe doctrine is a two-way proposition. It not only declares our opposition to foreign aggression in this hemisphere but pledges us not to intermeddle with European affairs. Granting that a private citizen may freely express his opinions on foreign matters, it is a very dangerous thing for the President of the United States to inflame foreign nations against us by declarations and speeches, and this in utter defiance of the intent of congress in passing neutrality legislation.

Domestic Spending Misdirected

The administration also is responsible for the country's weakened ability to meet an emergency in other ways than by neglect of direct military preparedness. It has placed the nation in the worst fiscal position in its history. Despite awareness of the dangerous international situation, the administration continued its lavish domestic spending. It never stopped pouring billions down rat holes of political waste, social experimentation and our socalled government planning.

Now we face the need for huge new expenditures with an already back-breaking burden of taxation and a federal debt that has shattered

Abstract of address delivered by Mr. Weir as president of American Iron and Steel institute at institute's annual meeting, New York, May 23.

the forty-five billion dollar limit. Likewise our industrial system must try to accept the monumental job that will be imposed on it by defense preparations under the handicaps that have been and are now imposed on it by governmental restrictions and interference. And perhaps most serious, this administration is directly to blame for a disunity among the American people such as never existed before.

And thus because of administration inefficiency, blindness, devotion to its pet brands of social and political philosophy, and disinclination to accept any advice from business or industry, this country is faced with the problem of doing on a hurry-up basis a job that should have been in normal progress for the past seven years.

I say this not in any sense of crying over spilt milk. The important thing is the lesson this record holds for the immediate future. That lesson is that the methods and personnel of the present administration can not set this nation to work as one man on the gigantic task of building real defenses. In this great program, which will cost billions, the people of this country have the right to demand that it be carried out effectively, economically and promptly. The first essential step toward preparedness must be a fundamental change in the attitude of government—and particularly in its attitude toward industry.

Industry is an arm of national defense just as much as the army, navy or air force. In fact, industrial preparedness must precede direct military preparedness. Industry must provide the weapons, the equipment and material of all kinds necessary to the training and maintenance of the armed forces. In addition, of course, industry must be prepared to supply the normal requirements of the country.

Industry Now Basic Defense

Large-scale defense preparation will require an infinite amount of planning and readjustment throughout the industrial system. The staggering size of the job has evoked forecasts that it will be two years before industry can function effectively. It can be said confidently that these forecasts are entirely too pessimistic. If government will decide on a definite defense policy; if it will let industry know exactly what is wanted; and then entrust to men who know industry the task of getting performance from industry, the country will be pleasantly surprised at the speed and efficiency with which industry will do its share of the job.

At the present stage, industry is our basic line of defense, and there must be a minimum of red tape and delay in permitting industry to gear itself up to meet defense necessities.

The steel industry, of course, will be of major importance in any program to prepare the country for defense. Not only is it a direct source of military and naval requirements, but it also is foundational to all other industry. To meet these demands, I am happy to say that our industry is at the highest state of technological development in its history. I shall discuss this in greater detail a little later. But first, against the background of the war and our own defense needs, let us consider some of the immediate problems faced by the steel industry.

Some war-created problems now on our doorsteps hold potentials of extreme danger. One is the maintenance of adequate raw material supplies. Seven of the 12 principal nonferrous materials used by the steel industry come largely or entirely from foreign sources. The most important are manganese and tin and the latter metal comes almost entirely from Dutch and British territories. Needless to say, all steel companies are aware of the situation and have been doing what they can to protect themselves against shortages of these vital materials.

Limit Scrap Export

But, unfortunately, no company and no industry can solve this problem alone. Negotiations with foreign governments are involved. Therefore, the accumulation of strategic raw materials is a problem of national defense and a proper function of federal government.

This segment of the problem, like the whole defense problem, has been badly mishandled. Economists estimate that we need reserve stocks of at least $800,000,000 worth of vital materials that must be imported. Congress appropriated $100,000,000 to be spent in four years. That program is in its second year. So far, less than $13,000,000 worth of these strategic materials have been purchased. Our position in respect to these vital materials is one that justifies grave concern.

Of a similar nature, except that it is susceptible to domestic control, is the situation with regard to steel scrap. With the beginning of 1939, there was a tremendous increase in the export of scrap to foreign countries. During the first nine months of last year, the average tonnage of scrap exported per month was 229 per cent of the monthly average from 1930 through 1938. This average monthly export was more than 13 per cent of the total accumulation of scrap steel in the hands of United States dealers on Sept. 30, 1939. Since then there has been a decline in scrap export, but it is still very high. Latest available figures show a monthly average of foreign shipments equal to approximately 180 per cent of the average of the period 1930-1938.

At various times, steel men have warned that it is against the interests of industry and the nation to permit this heavy exportation of scrap. The importance of scrap as a raw material in the steel industry is not fully realized by the public. Yet it is so important that it may be considered a vital "natural resource." Ton for ton it is actually more valuable than iron ore. It can be quickly converted into new steel because it has already gone through the refining process.

Under normal conditions, about 50 per cent of scrap is used in making new steel. It is unwise to allow too much scrap to leave our shores, because such exports represent the depletion of an extremely valuable resource. In my opinion, our stocks of scrap steel are now too low. In the interest of national safety, a limitation should be placed on export.

The world situation has also affected steel production. The war, of course, was the indirect cause of the extremely high rate of operations in the last months of 1939, which resulted in the establishment in the final quarter of the steel industry's all-time record for the number of ingot tons produced. Exports, however, were a minor influence.

The real demand for steel was occasioned by domestic buying to protect inventories against steel shortages such as occurred in the previous war. Since the first of the year, the reverse has been true. Domestic buying has decreased, apparently with the intention to reduce inventories to normal levels. Foreign buying, on the other hand, has greatly increased. During the first quarter of this year, exports trebled the volume of the same period in 1939. They constituted 14 per cent of total steel production and thus helped importantly to offset the decline in domestic consumption.

Export Demand May Rise

Contrary to experience in the last war, belligerents have not been taking the major portion of steel exports. Should the war continue, become even more extensive and more active, we may assume that export demands will greatly increase. Steel consumption of belligerents will multiply beyond their capacity to produce and neutrals will turn increasingly to the United States as the most important source of steel for their domestic requirements and for re-export.

Should this come to pass, there

(*Please turn to Page* 28)

"Crazy Quilt of Steel Mill Extras"

Discussed at Warehouse Meeting

■ "THIS crazy quilt of mill quantity and item extra charges"—as it was expressed by Walter S. Doxsey, executive secretary—was the main subject of discussion at the American Steel Warehouse association's thirty-first annual convention in New York, May 21-22.

"This crazy quilt . . . " he said, "stands as a challenge to all interested in bringing steel mill products to ultimate consumers through well-conceived channels of distribution. From the experiences arising with these extras, there should be a wealth of information available both from the mills and from the warehouses. If we will take advantage of this information and apply it to serve the best interests of all concerned with the production, distribution, and use of steel, the marketing machinery of our industry can be streamlined and synchronized with the pace-making advancements in production processes.

"The steel mills, as a whole, have no policies to govern constructively their relationships with distributor customers. With very few exceptions, the steel warehouses must pay the same price for the steel they buy from the mills as the customers to whom they must resell their merchandise.

Extras May Handicap

"And further, the steel distributor must contend with a weird and fascinating array of mill item extras, order extras, less-carload extras, and a perplexing combination of all these, which may help him in some instances and seriously handicap him in others. These mill extras are of such basic importance to the individual steel warehouse and to the distributing industry as a whole that they warrant earnest consideration.

"From many aspects, the grotesque array of mill extras now applied to various steel products are but gestures to manifest policies that are not always practiced nor enforced. As we look at the mill extras for each individual product, both fallacies and good features are apparent. If we examine them collectively, the complete absence of uniform, sound, and constructive planning to assure the producers equitable compensation for handling costly small orders and to promote efficiently and economically through secondary outlets the distribution of all steel products is amazing. . . .

"Compared with the simple item extras applied to cold-rolled strip, stainless sheets, and cold-finished bars, the quantity extra combinations applied to hot-rolled sheets appear tremendously complex.

Variations Are Geographical

"First, there are item extras on quantities under 2000 pounds; then there are order extras on the combined items weighing less than 7000 pounds; and finally, the purchaser may add to his order any other flat rolled items such as galvanized or cold-finished sheets, as well as roofing and sidings, to make up a carload.

"Just why the figure of 2000 pounds was selected for item extras no one knows. The figure of 7000 pounds suggests a truckload, and legend has it that this figure originated in Texas to facilitate shipments of sheets to inland communities in trucks that had delivered cotton to the seaboard.

"Of course, these extras make it easily possible to make up a mixed carload without paying any item or quantity extras. Still, the amount of compensation to the mill for handling undesirable quantities is practically nil and so is the degree of protection to the distributor against below-cost mill competition. The possibility of combining roofings and sidings with flat sheets gives the sheet metal distributor who sells these products along with flat sheets a buying advantage over the steel warehouse that handles flat sheets exclusively. The question may well be raised why reinforcing bars should not be combined with cold-finished bars or floor plates with stainless steel.

"If we add a few more flourishes to the extras for hot-rolled sheets, we come to the extras for galvanized sheets. The item extras consist of three brackets instead of two and they apply on quantities of 1500 instead of 2000 pounds. The order extras are in two brackets instead of one: Under 7000 pounds, and under carload to 7000 pounds. As with hot-rolled sheets, other kinds of sheets and roofings and sidings may be included to make up a carload.

"Here is an innovation—one set of extras for one part of the country and another set for the rest of the country. The set used in the southern, mountain, and Pacific coast states applies on items of less than 6000 pounds. The base price is available on items of 6000 pounds or more. The extras used in the rest of the country apply to items up to 40,000 pounds. In some brackets the differences between these two schedules are as much as $10 a ton.

Criticizes Selling to Peddlers

"The order extras on plates, floor plates, and structural shapes are presented here today as a distinct type of mill extras, in contrast to the others you have already seen. Both in theory and in practice the result of order extras of this kind is to invite and encourage customers to combine as many items as they can entice any mill to accept to make up an order whose total weight is 6000 pounds or more, and thus obtain all the desired items regardless of the diminutive size of any single item at the mill base price. These order extras afford little or no protection to the mill for handling small orders and there is little question about their diverting from the warehouse to the mill

many orders involving several items and totaling 4000, 6000, or 8000 pounds."

Failure or refusal of steel mills to recognize or protect their distributors by selling promiscuously to any "peddler having the money to pay for a small lot of steel" was criticized by A. Oram Fulton, president, Wheelock, Lovejoy & Co. Inc., Cambridge, Mass. Former president of the association, Mr. Fulton took issue with common mill practice enabling "irresponsible peddlers" to establish themselves, at the expense of responsible distributors, as being in the warehouse business because they "are able to get enough money together to put in a few tons of steel."

Following the report of the committee on hot-rolled carbon bars by J. Frederick Rogers, Beals, McCarthy & Rogers, Inc., Buffalo, chairman, the association went on record in favor of efforts to establish uniform mill extras throughout the United States, eliminating differentials now operative in several regions. Material reduction in the mill base quantity extra-limit with a base bracket of from 3 to 5 tons also was approved, as well as a suggestion that equitable extras be placed on orders under 1 ton. An order extra applicable to car-load shipments or an additional charge of 25 cents on less-than-car shipments was opposed by the membership which also favored no change in the cutting extra recently established.

Changes made in extras have not added to the profit of secondary distributors of alloys, according to F. W. Krebs, Super Steels Inc., Cleveland, chairman, alloy committee, but rather have increased costs to warehouses. The growing list of S.A.E. steels tends to increase jobber inventories. Mr. Krebs also noted an increase in buying from warehouses by aircraft manufacturers, although such volume is subject to strict inspection tending to higher costs of handling tonnage for this industry. Mill parity on small orders of alloys tends to show the high cost of such orders to the mill and is a step to aid jobbers in securing such purchases, he said.

Mill parity on cold finished bars on lots of 1500 pounds or less and the reduction of $5 a ton on the warehouse base prices has not yet worked to the advantage of the steel warehouse, according to George L. Stewart, Edgar T. Ward's Sons Co., Pittsburgh. Aggregate volume last year did not increase to any extent from that of 1938 and the reduction and changes resulted in a net lower return to the jobber of approximately $7.50 per ton, Mr. Stewart said, although an order extra in some districts works to reduce this decline. Profit in cold finished bars is centered largely in the workings of one or more extras.

Lewis Elected President

T. W. Hager, Peter A. Frasse & Co., New York, chairman, mechanical tubing committee, revealed a suggestion had been made that efforts be considered to establish a standard list of mechanical tubing sizes to be carried by warehouses. He questioned what could be classified as standard, saying this varied widely as to districts and the association took no formal action.

Q. Forest Walker, economist, R. H. Macy & Co. Inc., New York department store, spoke on pricing and suggested some methods in the retail trade which might be applied to small-lot steel selling by secondary distributors of the country.

J. Halsey McKown, assistant vice president, United States Steel Corp. of Delaware, presented the corporation's motion picture "Making and Shaping of Steel," speaking on "The Steel Warehouse, a Necessity," as a preamble.

Richmond Lewis, Charles C. Lewis Co., Springfield, Mass., was elected president of the association. C. H. Bradley, W. J. Holliday & Co., Indianapolis, and E. Jungquist, Percival Steel & Supply Co., Los Angeles, were named vice presidents and the following were chosen as members of the executive committee:

Lester Brion, Peter A. Frasse & Co. Inc., New York; A. C. Castle, A. M. Castle Co., Chicago; E. D. Graff, Joseph T. Ryerson & Son, Inc., Chicago; Charles Heggie, Scully Steel Products Co., Chicago; E. L. Parker, Edgar T. Ward's Sons Co., Pittsburgh; Phil Pidgeon, Pidgeon-Thomas Iron Co., Memphis, Tenn., and Mr. Fulton.

A. W. Herron, Jr., Jones & Laughlin Steel Corp., Pittsburgh, was elected treasurer. Mr. Doxsey continues as executive secretary. New directors for three years are President Lewis and Bud Lowenstine, Central Steel & Wire Co., Chicago. Mr. Fulton was re-elected a director for a three-year term. The three are directors-at-large.

Welded Steel Docking Float Built in 14 Days

■ **Fourteen days after the contract was awarded, Dravo Corp., Neville Island, Pittsburgh, had completed this 6 x 26 x 175-foot welded steel docking float for Lawrence Pipe Co., Mt. Vernon, Ind. Speed of the job was attributed largely to data given by employes in papers in the Lincoln Foundation award program, with which Dravo's management is co-operating by offering similar prizes for best papers written by its employes**

To Study Design Problems In Welded Building Field

■ A structural steel welding research committee to study problems of design and fabrication in the welded building field has been formed by the welding research committee of Engineering Foundation, 29 West Thirty-Ninth street, New York, in co-operation with American Institute of Steel Construction. Leon S. Moisseiff, consulting engineer, New York, was appointed chairman.

Program of the committee includes establishment of research fellowships in American universities. The first fellowship will go to Lehigh university, Bethlehem, Pa., and will be directed toward developing a satisfactory design procedure for beam-to-girder and beam-to-column connections for all kinds of welded building construction.

Correction

■ Lining for tunnel in the gate system of Mud Mountain dam, near Seattle, described in STEEL, April 22, page 39, is cast iron and not steel as reported. Lining is manufactured by the Olympic Foundry Co., Seattle.

Gear Makers Pledge Support to Government's Armament Plan

■ FORMAL approval of and a pledge for active support of the extensive program for national defense now being launched by the United States government was voted by the American Gear Manufacturers' association at its twenty-fourth annual convention at Grove Park Inn, Asheville, N. C., May 20-22.

It was pointed out that in the building up of highly-mechanized defense facilities gears and related products play a part beyond anything in past history. They are at the heart of mechanisms ranging all the way from precision range-finding and sighting instruments to the heaviest tanks and battleships.

The meeting, which embraced the presentation of numerous technical papers and committee reports, election of new officers and annual dinner, was attended by more than 100 members and guests of the association.

U. Seth Eberhardt, vice president, Newark Gear Cutting Machine Co., Newark, N. J., was elected president for the coming year to succeed Charles F. Goedke, president, Ganschow Gear Co., Chicago. W. P. Schmitter, chief engineer, Falk Corp., Milwaukee, was named vice president.

Elected members of the executive committee were: F. B. Drake, president, Johnson Gear & Mfg. Co., Berkeley, Calif.; W. A. Barr, president, Foote Bros. Gear & Machine Corp., Chicago; R. C. Ball, president, Philadelphia Gear Works Inc., Philadelphia; A. H. Candee, gearing engineer, Gleason Works, Rochester, N. Y.; and Mr. Eberhardt.

President Goedke reported that the junior mechanics training course sponsored by the association is now proving its worth by having made available to the industry at a most critical time many skilled men who otherwise would not have had the advantages of highly-specialized training in the difficult technique of gear production.

He also declared that the association's monthly index, initiated a year ago, has gained wide recognition—being presented in graphical form in leading business journals, including STEEL. Incidentally, the method by which this index is compiled month by month was later made clear to the members in a paper, "How's Business?", by W. L. Schneider, sales manager, Falk Corp., Milwaukee, and chairman of the association's commercial committee.

U. Seth Eberhardt

Elected president, American Gear Manufacturers association

Referring to the difficult days through which we are now passing, President Goedke said: "May we regain the confidence which sustained the American pioneers!"

Something of a similar note was sounded by George F. Nordenholt, editor, *Product Engineering*, New York, in addressing the annual dinner on "New Products—A Threat or a Promise?" He emphasized that it was only through co-operative efforts of many people working together in large companies which grew up under our system of free enterprise that discoveries such as those of Charles Goodyear and other American industrial pioneers grew "out of the attic" and developed into vast industries.

The speaker pointed out that the day of the lone inventor has passed, because of the highly complicated nature of modern science in industry, and that the hope for the future lies in the highly organized and expensively equipped research laboratories of much-abused "big business."

In addition to the usual attention to the theory of gearing, the practical side of gear production was dealt with specifically in two papers contributed by well-known members of the machine tool industry. One of these, "Boring Mills in a Gear Shop," by E. P. Blanchard, sales manager, Bullard Co., Bridgeport, Conn., was concerned with the machining of gear blanks—especially those of medium and relatively large size.

This paper, which gave consideration principally to use of vertical boring mills of turret-type and to vertical multiple-spindle chucking machines of station-type, illustrated effective tooling and work-holding setups on various sizes and shapes of blanks—including those sawed from solid bar stock.

To get maximum efficiency with modern cutting materials, it by no means is uncommon to have to run the machine at speeds giving 225 to 250 surface feet per minute when cutting steel, Mr. Blanchard stated. While 40-horsepower motors have been common enough for several years on 60-inch boring mills, the time has come when they likewise are necessary on 30-inch machines. On the latest machine, it not only is possible to combine the vertical and

cross feeds so as to generate accurate angular surfaces, but it also is possible through differential control to generate irregular contours such as those of torpedo sections, bottle molds, etc.

Going to the other extreme as far as size of work is concerned, Douglas T. Hamilton, Fellows Gear Shaper Co., Springfield, Vt., covered "Developments in Production of Fine-Pitch Gears." The speaker explained that the field for fine-pitch gears lately has been greatly extended by the broadening use of such mechanisms as motion picture cameras, geared camera shutters, projectors, recording devices, etc.

For these and many other similar purposes the tooth forms developed in the watch industry have not been found altogether satisfactory, Mr. Hamilton said. Therefore, the involute system has penetrated the realm of small gearing and a heavy demand has arisen for equipment and tools for cutting fine-pitch gears on this system rapidly and to high accuracy.

In work of this kind, the problem is not only one of cutting the teeth, which after all involves merely the application to small work of more or less conventional methods which have been perfected on larger work, but it also involves the holding of parts so small that some of them literally can be lost under a thumb nail. Therefore, a considerable portion of Mr. Hamilton's paper was devoted to work-holding systems which have been worked out in cooperation with the Eastman Kodak Co. and other makers of small gears.

In some of these setups the parts are gripped and ejected by pneumatic means; in others, stacks of blanks are "ganged-up" for multiple cutting—the ganged-up blanks in some cases being magazine fed to cutting position and automatically ejected therefrom.

Of the several papers dealing with more highly technical phases of gear making, that by Dr. Stewart Way, research engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., covered roller and gear pitting tests conducted recently. This paper involved a mass of mathematical analyses based upon test results and many practical conclusions were drawn.

Through study of the progressive development of circular and ring-shaped pits from tiny fatigue cracks, the writer has concluded that the crack is extended and widened through the action of an hydraulic wedge, that is, lubricant forced into the crack under the rolling pressure between contact surfaces. Thus a section of metal literally is pried out of the surface, forming a pit.

Contributing a paper on "My Experience With Gear Tooth Forms," A. A. Ross, in charge of manufacture of turbine gearing, General Electric Co., West Lynn, Mass., touched upon his own "adventures" dating back to 1902 and covering in particular railway and marine applications. The speaker stated that 38 years ago, interchangeability of gears and pinions was almost impossible because of the prevalence of incorrect tooth profiles.

"I might here mention," he added, "that if there are those of you who today show lack of interest in the work of your standardization committee, just bear in mind that if the conditions of those days existed today, you would be forced to cooperate whole-heartedly with that committee to save your own necks."

Another highly technical paper, based on extensive laboratory tests, was "Tooth Bearings in Bevel Gears," by Allan H. Candee, gearing engineer, Gleason Works, Rochester, N. Y. While the subject is one involving considerable complicated theory, Mr. Candee succeeded in clarifying it by photographs and diagrams showing exactly what happens between a pair of mating bevel gears when conditions are right and when wrong. This paper is of great value not only to those concerned with making gears but also to those concerned with their mounting and assembly.

★

Watch

for an important

announcement in

STEEL Soon!

★

It was pointed out in a paper, "Diesel and Gas Engine Load Characteristics," by Austin Kuhns, executive engineer, Farrel-Birmingham Co. Inc., Buffalo, that the violent torque fluctuations more or less inherent in these engines are inclined to build up dangerous resonant and critical vibrations. This throws responsibilities upon gear manufacturers which properly are not theirs, or which at least should be shared by the engine designers and builders.

Therefore, Mr. Kuhns suggested, before accepting gear contracts in this field, gear manufacturers should make sure that the engine designers have done everything possible to correct or overcome the undesirable operating characteristics of the prime mover in connection with which the gear drive is intended to function.

Steel Institute Moves To Aid Defense Program

(*Concluded from Page* 22)

sales value, are fundamental reasons why the industry's return on its investment has been chronically inadequate."

Another problem said Mr. Purnell is the determination of a proper depreciation policy. This problem is complicated further by tax regulations governing depreciation. These regulations, Mr. Purnell said, unfortunately are subject to constant change, are based upon inadequate practical experience and are motiviated by a desire for revenue.

Gov. Raymond E. Baldwin, Connecticut, the guest speaker at the annual dinner, declared that government policies over the past seven years have weakened the backbone of our national defense, industry and sound economy.

"This administration has spent millions for every conceivable purpose, and there have been some expenditures for national defense but nothing like what we now see is necessary. . . . We are seeing now that the first line of our national defense is industry, and the second line, the support line, is a sound economy. These are the backbone of our national defense and they have been weakened—terribly weakened—by the processes, the attitude of government over the past seven years."

B. F. Fairless, president, United States Steel Corp., and Mr. Purnell were re-elected vice presidents of the institute and H. L. Hughes, vice president, United States Steel Corp., was re-elected treasurer.

The technical session included the presentation of three papers: "The Control of Steel Composition and the Problems it Presents," by Earle C Smith, chief metallurgist, Republic Steel Corp., Cleveland; "Dimensional Variations in Rolled Steel Products and the Problems of Control," by A. C. Cummins, general superintendent, Youngstown district, Carnegie-Illinois Steel Corp.; "Producing Steel to Meet Physical Test Requirements," by C. H. Herty Jr., research engineer, Bethlehem Steel Co., Bethlehem, Pa.

Weir's Address

(*Concluded from Page* 24)

will be the temptation to regard it as one ray of sunshine on an otherwise dismal world. This would be understandable. Heavy export demand undoubtedly would stimulate domestic trade. Employment, national income and governmental revenues would improve, and therefore, our most important economic problems might seem superficially to be on the way to solution. How-

ever, not only the steel industry, but all industry and our people as a whole, should look on such seeming benefits with cold caution.

Let us remember the lesson of the last war. No real permanent benefit may be expected from destruction and waste. Whoever wins, war will not solve the fundamental problems of nations or their peoples. That can come only through constructive and co-operative effort. Perhaps this war will bring people to their senses and eventually produce just such an effort. Before that, however, we may look for an aftermath of world prostration which will largely or totally cancel any possible war gains.

The belligerents will have to rehabilitate themselves in world markets. They may be expected to fight savagely with economic weapons to recapture customers lost to neutrals during the war. By that time, let us hope, peoples will have lost enthusiasm for totalitarian methods of all kinds. But, even so, with their resources and credit exhausted, the war nations probably will continue to resort to totalitarian economics.

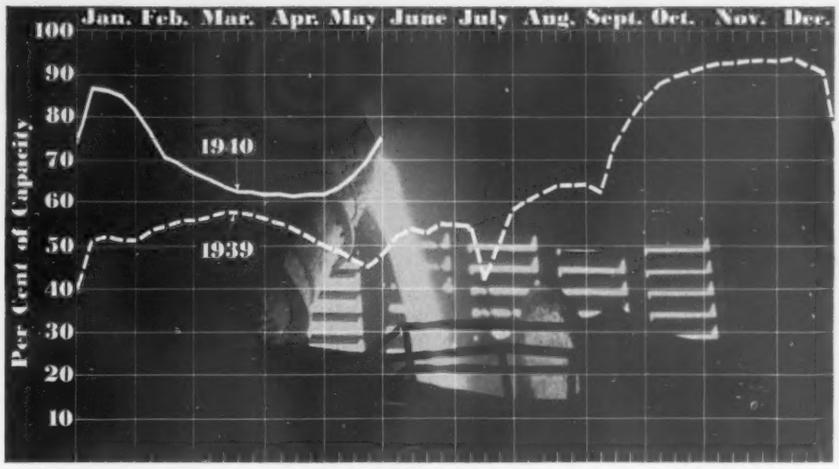
Under American standards of living, our country had a difficult time meeting competition of Europe in its days of peace. Certainly we may anticipate a much tougher assignment in meeting the kind of competition we will get after this war.

Let us keep this in mind for it is no less serious than our more immediate problems. This will be particularly true in any consideration of adding to capacity. Of course, where our own national defense needs require expansion, then we must provide additional capacity regardless of future consequences.

But aside from this, let us remember that the rapid and uneven expansion stimulated by the last war was a major factor in producing the depression of 1920 and 1921 and also the current depression. In many cases the negative economic consequences of this type of expansion are still with us. So far as possible, therefore, the wise course for industry is to strive only for a sound growth predicated on domestic requirements plus normal export trade.

American Steel & Wire To Reline Donora Stack

■ American Steel & Wire Co., Cleveland, a United States Steel Corp. subsidiary, will reline No. 1 blast furnace at Donora Steel Works, Donora, Pa. to permit improved practice. A new primary gas washer will be installed and the three stoves will be changed in design to eliminate one stove and attain higher blast furnace temperatures.



PRODUCTION... Up

■ STEELWORKS operations last week advanced 5 points to 75 per cent, the highest point since the first week in February. Seven districts showed gains, two declined slightly and three were unchanged. A year ago the rate was 48 per cent; two years ago it was 28.5 per cent.

Chicago—Rose 5 points to 75 per cent, the highest rate since the last week of January, an increase of 18 points in four weeks.

Birmingham, Ala.—Unchanged at 83 per cent for the fifth consecutive week with 18 open hearths in production.

Detroit—Off 1 point to 79 per cent because of slight midweek adjustment.

Central eastern seaboard—Gain of 7 points to 67 per cent with one producer near full capacity and others adding open hearths, presaging a further rise.

Pittsburgh—Advanced 8½ points to 73.5 per cent, with further upward movement during this week expected.

Wheeling—Declined 3 points to 85 per cent, with little change expected this week.

New England—Steady at 56 per cent, the same schedule expected to hold this week.

St. Louis—Jumped 7½ points to 55 per cent as addition of two large furnaces more than offset withdrawal of one small unit.

Cleveland—Expanded 6 points to 78 per cent, all producers contributing to the upturn. A further upturn of 5 to 6 points is indicated for this week.

Cincinnati—Continues at 61 per cent, with the average for most plants considerably higher.

Youngstown, O.—Up 3 points to 57 per cent with 54 open hearths and three bessemers active. Schedule for this week indicates a further gain. Carnegie-Illinois Steel Corp. blew in its second blast furnace at Farrell, Pa., last week.

Buffalo—Increased 11½ points to 65 per cent as several open hearths were added.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

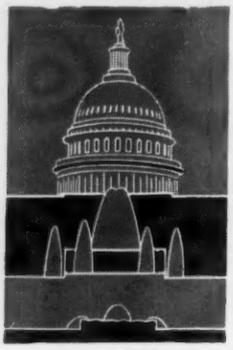
	Week ended May 25	Change	Same week 1939	1938
Pittsburgh ...	73.5	+ 8.5	36	22
Chicago	75	+ 5	49	29
Eastern Pa. ...	67	+ 7	37	27
Youngstown ..	57	+ 3	45	27
Wheeling	85	— 3	59	41
Cleveland	78	+ 6	54	26
Buffalo	65	+11.5	42	21
Birmingham ..	83	None	57	69
New England..	56	None	45	30
Cincinnati	61	None	52	28
St. Louis	55	+ 7.5	39	33.3
Detroit	79	— 1	57	18
Average	75	+ 5	48	28.5

April River Traffic Heavier at Pittsburgh

■ River commerce in the Pittsburgh district showed little change in April over March figures, according to the United States engineer's office. Tonnage was boosted somewhat in March by the breaking up of ice jams which had stalled shipping during February. Coal tonnage dropped considerably during April.

However, steel shipments rose on the two major streams. Ohio river steel shipments were 160,400 net tons, against 134,000 in March, while on the Monongahela 99,700 tons moved against 84,800 in March. Both totals are well ahead of April, 1939.

Windows of *WASHINGTON*



By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ INDUSTRIAL mobilization program proceeded with lightning rapidity in Washington last week, dealing largely with legislative action.

Senate passed army appropriation bill for 1941, recalling it from committee so that President Roosevelt's requests for additional appropriations could be added before final action was taken. Navy appropriations bill was likewise passed later in the week.

Army bill passed by house provided $784,999,094. Additional $712,712,274 was added by senate after President's request, making a total of $1,497,711,368 as finally enacted into law.

Plan Naval Air Facilities Expansion

Bill, as passed by senate, was based on regular estimates amounting to $853,356,754, plus additional appropriations asked by Mr. Roosevelt in his special message to congress. In addition to cash appropriations authority was granted for making additional contracts totaling $323,229,636, divided as follows: Airplane procurement, $103,300,000; military posts, $6,000,000; ordnance equipment, $133,774,679; chemical warfare, $2,036,910; seacoast defenses, $10,418,047; signal corps, $1,700,000; and emergency funds, $66,000,000.

Navy appropriations bill passed by senate totaled $1,302,472,577. This included $34,000,000 appropriated for the President's use, plus a like sum for contractural authority. Total appropriations for Mr. Roosevelt's use, for both army and naval expenditures, are $200,000,000.

Naval air facilities expansion requested by the President would increase naval planes from 3000 to 10,000. Number of pilots would be increased from 2602 to 16,000 and about $124,132,000 would be spent immediately in building air bases in continental United States and on American-owned islands in the Caribbean, mid-Pacific and Aleutian Islands.

In a joint statement, Senator Walsh, chairman, senate naval affairs committee, and Representative Vinson, house naval affairs committee, said the program had been agreed upon at a conference with President Roosevelt and naval officials. They said Mr. Roosevelt wants it clearly understood the plan "is not in its entirety to be undertaken at once," but looks toward future.

There is no doubt President Roosevelt plans calling industrial leaders to Washington to help with the proposed industrial mobilization program. He stated definitely, however, at a press conference last week, that he does not contemplate setting up any commission such as the World war industries board.

Chief Executive declared at the same press conference that one bottleneck hindering program's rapid consummation at present is production of high-speed military engines. He asserted it would be necessary for the country to increase materially production of 1000-horsepower airplane engines.

Mr. Roosevelt added he does not expect labor to take advantage of the present situation. He stated emphatically, however, he does not want government to weaken social gains made during past few years and that he favored a 40 to 42-hour week.

ADMINISTRATION HAS SPENT $6,265,000,000 FOR DEFENSE

Present administration has spent $6,265,000,000 for national defense, according to figures made public by the government last week after recent criticism in the senate.

Budget bureau has released preliminary statement covering seven years' national defense expenditures. Report shows that although appropriations' greater share has gone into pay, rations, subsistence and maintenance of existing military establishments, expenditures already have resulted in 130 new warships, nearly 3200 new airplanes for army, navy and marine corps and a 270,434 increase in officers and men in the three services.

War department figures show that in fiscal years 1937-1939 more than 65 per cent of its expenditures were for pay, rations, forage and similar items, including maintenance of more than 100 army posts and stations. Current fiscal year expenditures for those purposes, despite great increases for new equipment, will still aggregate more than 45 per cent of total military expenses.

New Equipment Allocation Higher

Only 2.8 per cent of war department's 1937 military expenditures, totaling $380,000,000, was for purchase of new equipment, including airplanes, tanks, antiaircraft guns, artillery and other items. Fourteen per cent was spent to replace and modernize wornout or obsolete equipment, 5 per cent for maintenance of equipment and ammunition. Remainder was expended for pay, clothing, rations, subsistence, travel, army post maintenance, building construction, similar items.

Expenditures in 1938 aggregated $402,000,000, of which only 1.66 per cent was spent for new and additional equipment. Replacement and modernization that year remained at 14 per cent. During past fiscal year, with appropriations totaling $455,000,000, expenditures for new equipment increased to 5 per cent. Replacements and modernization declined to 13.5 per cent; equipment and ammunition maintenance received 5.5 per cent.

Current fiscal year appropriations and obligations total $838,000,000. Allocation for new equipment will increase to 24 per cent of the total, including the $300,000,000 army air corps expansion program. Gains for new equipment are partially at

"I want Easy Roll MonoRail!"

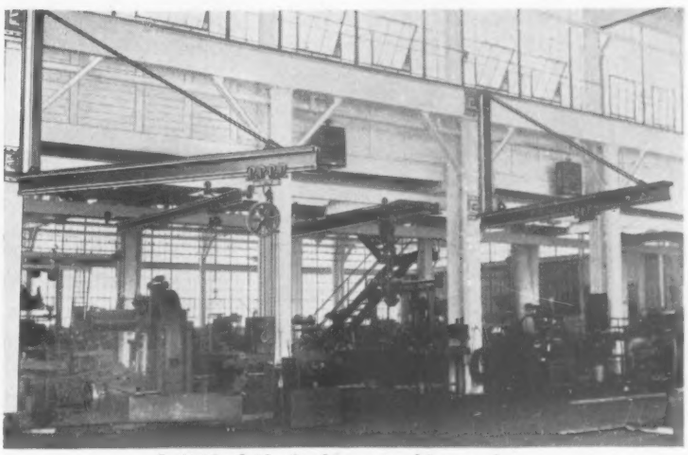
Small system in sheet metal plant.

"You mean American?"

"Sure, that's it! The track we put up the other day—the gang in the shop says the trolleys are so easy to push."

"That's right! I saw the first guy try it out. His load got away from him and rolled 30 feet down the track before it stopped. I guess he was used to our old rail."

This actually happened in a large automotive plant where they originally installed their own overhead system. They now call for "Easy Roll" track, a name they coined after the above experience.



Individual jibs for heavy machine service.

American MonoRail is "Easy Roll" because it's a high carbon, twin section rail, with overlapping splice to eliminate butt joints and a one piece forged hanger clamped in the rail head to prevent interference with trolleys. Trolleys "Roll Easy" because they contain precision bearings.

Let an American MonoRail engineer show you these features and explain the cost saving advantages of specialized overhead handling equipment.

Two cabs operate on long span crane.

SEND FOR THIS BOOK

254 page catalog sent on letterhead request.

THE AMERICAN MONORAIL COMPANY

13102 Athens Ave. Cleveland, Ohio

expense of replacements and modernization, that fund having been decreased to 9 per cent of the total. Equipment and ammunition maintenance allocations also were decreased to 3.6 per cent.

Navy department likewise made public figures showing how naval appropriations for the past three years have been expended, and illustrating defensive trends in recent years.

Regular and deficiency naval appropriations in 1937 totaled $530,184,932. Expenditures for new ship construction aggregated $155,008,729; emergency funds for shipbuilding totaled an additional $25,513,345. Maintenance expenditures were $329,419,997, plus emergency total of $920,573. Pay, subsistence, transportation, other personnel items aggregated $177,630,366.

Appropriations in 1938 totaled $530,710,450; expended for new ship construction, $178,716,262; maintenance, $362,073,547; emergency ship construction, $12,369,036; emergency maintenance, $17,798; pay, $187,181,399.

Last fiscal year appropriations totaled $592,150,744; new ship construction expenditures aggregated $222,484,222; maintenance, $374,797,873; emergency ship construction, $4,225,083; emergency maintenance, $68,008; pay, $197,917,436.

Naval appropriations for current fiscal year total $931,084,504; total national defense appropriations for this year are $1,297,000,000, according to the budget bureau.

Army has obtained an increase, says the bureau, of 1200 airplanes; 107,000 men in the regular army; 62,000 in the national guard, and nearly 20,000 in the reserve; 8200 motor vehicles; 700 tanks, armored cars and combat cars; 400 antiaircraft guns and 750 antitank guns.

Navy has gained 2 aircraft carriers; 7 cruisers; 7 light cruisers; 13 submarines; nearly 2000 aircraft; 55,250 manpower, regular navy, 16,150 reserves, and 11,400 marines.

These total gains include the replacement of many over-age and obsolete vessels, which have been retired, it was pointed out.

REVENUE DEPARTMENT LEVIES EXCESS PROFITS ASSESSMENT

Commissioner of internal revenue has advised Senator Tobey, New Hampshire, excess profit tax totaling $3,583,069 has been assessed against aircraft and shipbuilding contracts, as required by the Tobey amendment to Vinson naval bill and subsequent legislation. Act restricts profits under government contracts to 10 per cent in shipbuilding and 12 per cent in aircraft contracts.

Tobey amendment to Vinson naval bill was enacted in 1934. Prior to enactment of this law, profits as high as 90 per cent had been made on government contracts for aircraft and war vessels.

SUPREME COURT GRANTS REPUBLIC LIMITED REHEARING

United States Supreme Court last week granted Republic Steel Corp., Cleveland, a limited rehearing in connection with the company's national labor relations board case.

Rehearing is to be limited to questions raised pertaining to the board's order directing Republic to pay back wages to discharged employes without deducting from the back pay money employes received from WPA or other relief agencies. Labor board's order has held this relief work money was not deductible.

TIN PLATE SCRAP EXPORTS THIS YEAR TOTAL 2589 TONS

Tin-plate scrap exports during first four months this year totaled 2589 tons, valued at $49,853.38, according to state department. April exports were 160 tons, worth $2960.

Japan, in all cases, was the destination for tin-plate scrap exports. Forty licenses have been issued for export of this material during the present calendar year; only four were granted in April.

WAGE-HOUR ADMINISTRATION CRITICIZED BY SHIPBUILDERS

Spokesmen for private shipbuilding concerns now working on naval warship contracts told house naval affairs committee last week there has been considerable improvement since 1933 in methods and time required to build naval vessels. They told the committee they still are hampered, however, by restrictive labor legislation.

Witnesses agreed wage-hour administration's interpretation of the wage-hour law is interfering seriously with training of skilled workmen for shipyards, which now have 68 ships on the ways.

A. B. Homer, Bethlehem Shipbuilding Corp., said his company had been compelled to stop its training program because it was required to pay time-and-a-half overtime to men who voluntarily pursued the training course after hours.

J. B. Woodward, vice president and general manager, Newport News Shipbuilding & Drydock Co., suggested the navy's local inspectors be given greater authority to make decisions to save time now spent in referring relatively minor matters to Washington.

It will do little good for congress to put government and private shipyards on a 48-hour week if hundreds of subcontractors supplying them with materials are held to 40 or 42 hours a week, H. G. Smith, president, National Council of American Shipbuilders, testified.

Mr. Smith said one of the most serious bottlenecks in naval construction was delivery of ordnance, armor and other equipment furnished by the government.

COURT MANDATE ON MINIMUM STEEL WAGES HANDED DOWN

Procurement division, treasury department, sent a notice to all government contracting officers last week calling their attention to Supreme Court's ruling upholding labor secretary's wage determination in the iron and steel industry. Mandate enjoining companies that contract to sell goods to United States government under the Walsh-Healey act to abide by Madame Perkins' wage ruling was handed down late last week.

Counsel for Lukens Steel Co., Coatesville, Pa., and other steel companies who had taken their fight against Secretary Perkins' wage ruling to the Supreme Court had not filed motion for reargument by last Friday, the deadline.

HOUSE COMMITTEE FAVORS SCRAP EXPORT LICENSE BILL

House military affairs committee has favorably reported out a bill introduced by Representative Smith, Connecticut, empowering the President to prohibit iron and steel scrap and pig iron exports except under license. Hearings on the bill, introduced early this year, were held several months ago.

Reporting the bill, house committee provided that "any material which is included in the war department's list of critical and strategic materials" shall not be exported except under license issued by the President. List includes, also, aluminum, antimony, ferrograde manganese, tin and tungsten.

GOVERNMENT WALSH-HEALEY PURCHASES TOTAL $498,735

During week ended May 11, government purchased $498,735.42 worth of iron and steel products under Walsh-Healey act as follows: Bourlier Sheet Metal Works Inc., Louisville, Ky., $10,764; A. Finkl & Sons Co., Chicago, $23,400; Columbia Steel Co., San Francisco, $100,000; Philips & Davies Inc., Kenton, O., $22,700; Indiana Steel & Wire Co., Muncie, Ind., $91,434 (estimated).

Joshua Hendy Iron Works, San Francisco, $17,657; American Bridge Co., Pittsburgh, $99,794.32; Pittsburgh Steel Drum Co., Butler, Pa., $14,945.10; Commercial Shearing & Stamping Co., Youngstown, O., $26,400; American Car & Foundry Co., New York, $81,167; and Osgood Co., Marion, O., $10,374.

50,000 PLANES

Their Production May Require Aid from Automakers

DETROIT

■ FIFTY THOUSAND airplanes are small potatoes in the automotive sense of the word "production", where output is reckoned in thousands per day, but under present manufacturing methods used in the airplane industry, the assembly of this many planes in one year would be a difficult task.

Observers here point to two glaring difficulties which confront aircraft builders to varying degrees. One is the woeful lack of standardization in parts and subassemblies. The other is the serious shortage of skilled labor, conversant with production methods and tools.

It is said no two airplane builders can agree on any one phase of design, and there is even universal disagreement on such an apparently small item as the proper design of engine test houses. If mass production of planes is to be started, the first need is for a meeting of minds on what is to be built and how it can be standardized so necessary jibs and fixtures, tools and equipment can be provided to the end that supply of parts and subassemblies can be farmed out to high-production parts manufacturers.

Adopt Automotive Methods

This calls for a fairly complete upheaval in present concepts of what an airplane is and how much it is to cost. And in the opinion of many, such an upheaval is only a matter of weeks, Conferences now under way at Washington, at which the benefit of automobile production minds will be available, are likely to lead to some completely new manufacturing principles for airplanes, from engines all the way down to tail and wing assemblies.

There is talk of priority systems being established on manufacturing facilities and manpower, so that aircraft production will get the first call, even to the subjugation of automotive production.

As far as manpower and skilled labor are concerned, it is quite true present technicians, such as skilled tool and die makers, are in foreign territory when transferred to aircraft work, as it is now practiced. Remedy here is simply to change aircraft work to conform with what is now being done in the automotive field, and not to attempt any re-schooling of skilled labor.

As far as assembly plants for aircraft are concerned, there is no bottleneck here. Plenty of idle plants now are available, and new ones can be built in short order. The 450,000 square feet added to Glenn L. Martin facilities in Baltimore recently was in production in 11 weeks, from the time the contract was placed until operations started. The 600,000-odd square feet set up for Curtiss-Wright was turning out production in only 13 weeks.

Engine Manufacture Slow

There is however, a certain bottleneck in aircraft engines, principally because of the long drawn out and costly methods necessitated in their manufacture. For example, one type of current engine follows through a devious sequence of production steps about as follows: Parts are finished to precision tolerances and oiled before assembly. Oil then is removed and the parts assembled, followed by reoiling after assembly. Then after the primary test, engine is completely disassembled for a minute inspection, and parts are re-oiled, pending reassembly to prevent any corrosion. Cleaned before final assembly, the parts are fitted back together, the assembly oiled again and a final quick test given before the engine is approved.

Such a procedure probably yields engines that are well nigh perfect and with a safety factor against failure of probably 5 or 6 to 1. But engines for 50,000 planes in a year at such a slow pace with existing facilities is almost impossible.

German plane production of a reported 4000 per month appears awesome, but German planes are built at no such exacting standards as those outlined above. They are built in droves and at comparatively low cost. The Germans have adopted American automotive manufacturing technique to aircraft production, and while some of their equipment is good for only 12 hours or so in the air before overhauling, nevertheless there are a dozen more planes ready to take to the air each time one comes back for servicing or collapses.

Expansion Feared

All large airplane plants in this country have plans drawn up for extensive expansion programs, but will not appropriate funds until government assistance is guaranteed. One manufacturer relates he would like to double his plant capacity but is not going out and borrow the money, for fear that any one of a dozen things might happen: First, the war might end and leave him with nothing but cancellations. Second, he probably would lose control of his plant to financial interests. Third, it is futile to expand production without definite orders for definite types of ships in hand, and as yet he does not have these. And so on.

A revolution in aircraft manufacture, under the stimulus of an emergency, real or fancied, appears to be at hand. Automobile builders, with their skill at cutting ruthlessly across miles of red tape, at cutting costs to reasonable levels, and at getting a huge job done efficiently and in a hurry, probably soon will be drawn actively into the picture.

In 1939 the automobile industry used 5,993,590 net tons of steel or 18.1 per cent of total output. Assuming this country will build 5000 super bombers and 45,000 light planes, conservative estimates indicate this is likely to involve less than 300,000 tons of metal, of which about 180,000 tons probably would be steel, including armor plate. On this basis, the aircraft industry with an output of 50,000 planes a year would only use 3 per cent of the amount of steel used by the auto industry and less than 1 per cent of the annual steel ouput on the 1939 basis.

MEETING A SERVICE CHALLENGE

Coal mine shaker conveyors work in cramped quarters. If a conveyor fails, everything stops until repairs or replacements are made. So conveyors must be capable of continuous operation.

One manufacturer now meets the challenge by using Chromium-Molybdenum (SAE 4140) Steel for the all-important crank shafts of his shaker conveyors.

When properly heat treated, the steel develops good tensile and fatigue strength in the 5¾" section used, together with adequate hardness. Conveyor crank shafts made of this steel are achieving remarkable service records.

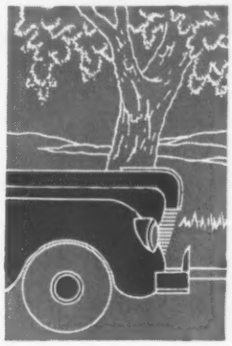
If anywhere in your product there is a part which presents special difficulties it may likewise pay you to investigate the possibilities of Molybdenum steels. Complete data will be found in our technical book, "Molybdenum in Steel," which is sent free to interested production executives and engineers on request.

PRODUCERS OF MOLYBDENUM BRIQUETTES, FERRO-MOLYBDENUM, AND CALCIUM MOLYBDATE

Climax Mo-lyb-den-um Company
500 Fifth Avenue · New York City

MOLY

Mirrors of *MOTORDOM*



By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

■ AT THIS stage it looks like a busy summer for Detroit, if the forecast of a war department spokesman becomes fact. This party said last week, "Detroit plants should get enough orders from the army to keep every plant in the area going 24 hours a day, six days a week for ten months."

It is assumed that this interpretation figures in the normal complement of passenger car manufacture, but even so it represents a virtual impossibility. In the first place, there are not enough men available to meet such a production. In the second place, the mere placing of orders or appropriating of funds does not mean that production can be started at once. Detailed specifications are needed, including standardization of what various plants are to build. Material is needed, machines are needed. On both the latter scores there would be serious hindrances to anything like 24 hours a day production.

Red Tape Delays Spending

The army is reported to have budgeted $89,000,000 for "ground mechanization," equipment which will be concentrated in Detroit plants. Well, this sum, if it were all spent for vehicles, probably would not cover much over 85,000 units, and if some passenger car facilities were pressed into service this total could be whipped out in a couple of months on a normal production basis.

Exaggerated statements such as the one above, emanating from Washington, are typical of much of the loose thinking in the current hysteria. It is true there is going to be some substantial defense business placed in this area, but what is called for now is some calm, intelligent planning under supervision of industrial leaders, and less brash boasting of what is going to be done overnight.

A little recognized phase of government business is that the appropriation of fantastic sums of money for material and equipment does not mean the spending of such sums. This is probably the answer to what has happened to the reported $7,000,000,000 appropriated for military purposes in the past seven years—the appropriations have been made but lie around rotting while official red tape holds up actual expenditures.

Nevertheless a number of Detroit manufacturers are scrambling around Washington to see what they can grab off in the way of business. Officials of various companies—Briggs, Packard, Continental Motors, etc.—have been conferring with Louis Johnson, assistant secretary of war in charge of procurement of supplies. It is still too early, however, to learn of any definite awards.

Ford Motor Co. is stated to have offered the services of its huge plant on 24-hour notice for government assignments. A Chevrolet plant in Saginaw already is completing a consignment of machine guns for the army.

■ SUGGESTION of Gen. Hugh Johnson that the shortage of skilled pattern, tool and die makers, termed one "bottleneck" in industrial armament expansion, be forestalled by freezing the creation of new and changed models of automobiles caused many an eyebrow to lift around here. Of course it is too late now to do any freezing of 1941 models because they are nearing the finishing touches as far as tools and dies are concerned, but a year hence the story may be different, if the international crisis hangs on. When the hump on new model preparations is passed, about July 1, much of the pressure on tool and die shops will be lessened, and their facilities should be readily available for armament work. Right at the moment, though, these shops are jammed to the hilt with work, many of them working three shifts, and this situation could not be relieved unless by sudden establishment of priority systems by government edict. This is not likely for a while.

With much of the emphasis on airplane production in the defense program, the tool and die shops may be called on to lend assistance to production of tools, dies, jigs and fixtures for plane builders. A disconcerting angle is that many skilled workers in the automotive tool and die trade have been found to be entirely unsuited to working on aircraft parts. Airplane companies have raided the local supply of such skilled workmen in recent months, and many of these men have proved ill adapted to their new field.

Aircraft Technique More Exacting

One reason for this may be that aircraft and automobile design and production techniques are far apart. The one calls for a jeweler's precision, slow, laborious, high-cost methods. The other demands intense speed, permits reasonable tolerances on work, and entails cutting costs at every turn. Perhaps one solution may be to revise entirely the concept of aircraft manufacture, and pattern it more along automotive lines.

Speaking of tool and die shops, a new plant recently was built on the outskirts of this city to specialize on aircraft work. From the day the first shovelful of earth was turned at the plant site until the machines were whirring inside the finished building was only a matter of three weeks. Last Wednesday a crew of machine operators were

Material appearing in this department is fully protected by copyright, and its use in any form whatsoever without permission is prohibited.

hard at work while out front the company's name still had not been painted on the office entrance.

Some production steel tonnage for initial runs of 1941 models has been placed by the early starters like Packard, Buick and Studebaker. More is expected to be released in the next 30 days. Die tryout lots are being requisitioned regularly, indicating that work is proceeding on schedule for new models. The large-volume producers—Chevrolet, Ford and Plymouth—still are releasing materials and parts for 1940 models and unless the retail market takes a nose-dive Ford and Chevrolet probably will continue producing through July.

Chevrolet's last parts release was No. 9 and was scaled down sharply from No. 8. Two more releases are scheduled for the current model, there being usually 11 releases throughout the model year. No. 10 is expected to be back up to the normal level.

Appreciable stiffening in the steel market was observable last week, one company issuing hold-up instructions on all new business, ostensibly because of mounting scrap prices and a complete congestion of its order department. More than one steel company representative in this district is predicting a steel shortage by the third quarter of the year, assuming the European war does not suddenly scuttle itself. Higher costs of raw materials seem to point to higher finished steel prices, probably in the fourth quarter. Those companies which have been offering steel at price concessions applying to shipments before June 30 have shut off the bargain rates, but so far the predominant participation in the steel market has been by a flood of small-tonnage users who have feared being cut off without supplies when the automobile companies come into the market in a larger way.

■ AS IN all years when "volume selling" is the watchword, excessive allowances for used cars are being offered by dealers who follow the questionable plan of "losing money on the individual sales and making it up on the volume." Bulletin just issued by the Detroit dealers' association describes the local retail scene as the "battle of Wayne—the battle for volume sales through wild trading, the battle for abnormal registrations." The Wayne county battle now is said to be waging furiously and will continue on through next month. Figures are offered to support the contention, showing increases in dealer sales November through February of 1940 models 64.9 per cent over the same period in the 1939 model year, comparing with a national average of 21 per cent. Hysteria and gullibility of dealers' over customers' reports of "wild" allowances on used cars explain the situation.

As published in the *N.A.D.A. Bulletin*, the matter is summed up in the words of a Chicago dealer group: "The buying public when it comes to our agencies must feel like Alice in Wonderland. And it is a wonderland where a dealer will use his entire markup to make a sale, or where he will allow as much or more for a used car of a certain year than he did twelve months ago."

Canvass of several Detroit dealers indicates used car stocks are building up to high levels. This is true in most "new car" years such as the present, but new problems are presented, such as how to move merchandise in the $50-$200 price range. Formerly such inexpensive used cars found a good market among workmen in plants here who for a down payment of $5 or $10 could have transportation to and from their jobs. This merchandise is not moving this year for some reason, one explanation being that these buyers have stepped up a notch because of better financing arrangements possible through banks and loan companies, and are now buying cars in the $200-$500 range.

Dive of the stock market in the past few weeks is expected to have an adverse effect on car sales, many buyers always being forced into hiding because of the unsettling effect of bad news, whether is affects them personally or not. This would suggest an immediate tapering in the rate of new car assemblies.

However, April retail sales of new cars and trucks in the United States totaled 410,921 units, a gain of 3 per cent over March, and 31.9 per cent higher than April, 1939, according to the Automobile Manufacturers association.

Pontiac's demon statisticians have been at it again. They announce, after much pencil work, that the 2,000,000th car to be built by this division will leave the final assembly line at 11:03 a.m., June 5; further that the rear axle of this milestone-marking car will be made on the afternoon of June 3, that the motor block was poured in the Pontiac foundry on May 15 and will come off the bank on June 3. Three hundred veteran employes, in company with high GM officials, will greet No. 2,000,000 as she rolls from the line. By way of diversion, the car's tires will be filled with air shipped in cylinders from California, the radiator will brim with water sent from New York city, the fuel tank will have Michigan gasoline, the engine Pennsylvania oil.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1938	1939	1940
Jan.	226,952	356,962	449,314
Feb.	202,597	317,520	421,820
March	238,447	389,495	439,911
April	237,929	354,266	.....
May	210,174	313,248	.....
June	189,402	324,253	.....
July	150,450	218,494	.....
Aug.	96,946	103,343	.....
Sept.	89,623	192,678	.....
Oct.	215,286	324,688	.....
Nov.	390,405	368,541	.....
Dec.	406,960	469,120	.....
Year	2,655,171	3,732,608	.....

Estimated by Ward's Reports

Week ended:	1940	1939†
April 27	101,405	86,640
May 4	99,305	71,420
May 11	98,480	72,375
May 18	99,030	80,145
May 25	96,810	67,740

†Comparable week.

Oldsmobile Buys Foundry

Oldsmobile division of General Motors Corp. has announced purchase of former properties of Ryan Bohn Foundry Co. in Lansing, including buildings and 50 acres of land for construction of forge shop. Remodeling and new buildings will require several months for completion and installation of equipment. Eventual employment will be 400. Property adjoins Fisher Body plant in Lansing and brings total area devoted to Olds manufacturing work in Lansing to 183 acres. The project was outlined in these columns March 4.

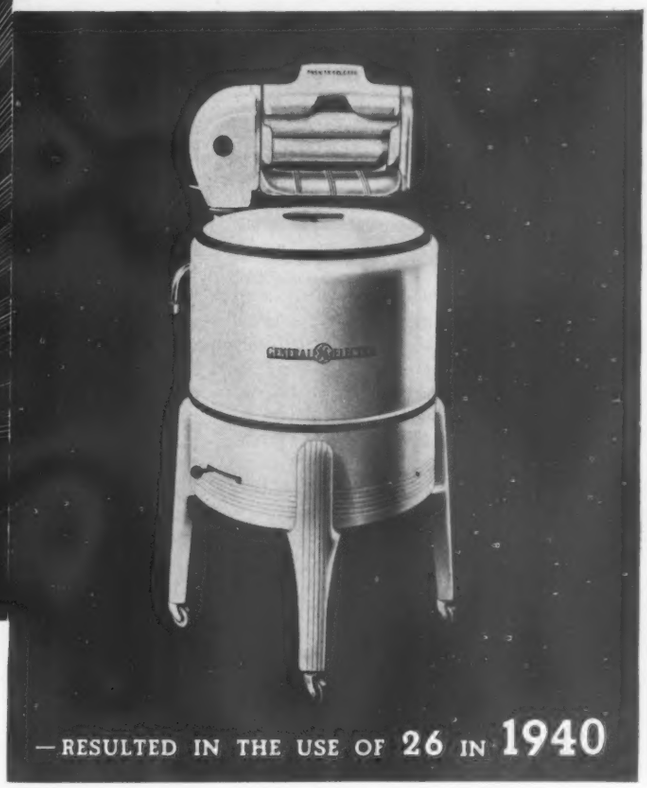
Ford Motor Co. last week filed its balance sheet as of Dec. 31, 1939, with the Massachusetts commissioner of corporations and taxation, Boston, showing a profit and loss account of $601,239,506 and total assets of $691,911,949. This compares with the 1938 profit and loss account of $588,821,275 and total assets of $673,496,284. The profit and loss increase of $12,418,231 is equal to $3.59 a share, par is $5, on 3,452,900 shares of capital stock. The most significant item in the 1939 balance sheet was the increase of more than $18,000,000 in the machinery and equipment account.

The figures above do not take into consideration any dividends that may have been paid. There is no information available on this point as the company is a closed corporation with the Ford family owning all of the stock.

STAMINA

—DIE CASTINGS STAY ON THE JOB

9 DIE CASTINGS SPECIFIED IN **1931**



—RESULTED IN THE USE OF **26** IN **1940**

Many eyebrows were raised when 9 ZINC Alloy Die Castings were specified for decorative and working parts of the 1931 washing machine shown here. But the fact that 26 die castings are similarly employed on a 1940 model—produced by the same manufacturer—is of greater significance to design engineers.

To those unfamiliar with ZINC Alloy Die Castings, this progress story offers convincing evidence of their suitability for metal parts that are under mechanical stress. To the thousands of present users of die castings, the story gives additional assurance that they are taking advantage of one of the most economical and efficient methods of parts manufacturing.

The successful application of ZINC Alloy Die Castings to washing machine production is just one of hundreds of similar case histories to be found in the files of the country's commercial die casters. If you are not thoroughly informed on the physical and economic advantages offered by this modern metal and production method, we suggest that you consult a commercial die caster—or write to The New Jersey Zinc Company, 160 Front Street, New York City.

Copies of earlier advertisements in this series gladly mailed on request.

The Research was done, the Alloys were developed, and most Die Castings are made with

HORSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC

War Requirements Increasingly Divert Canada's Steel Output

TORONTO, ONT.

■ CANADA'S iron and steel industry is being increasingly turned over to war materials production, with new business appearing in continually greater volume. Industry in general throughout the Dominion is operating at virtual capacity. Government officials promise still greater expansion in activities, necessitating a general increase in output.

Finance Minister Ralston reports Canada will expend more than $1,100,000,000 during fiscal year ending March 31, 1941. This includes war expenditures and ordinary public service expenses. Naval expenditures are estimated at more than $100,000,000.

Contracts let in Canada by the Canadian and Allied governments to May 15 totaled $275,000,000. Canadian government placed more than $200,000,000, Allies about $75,000,000. Approximately $50,000,000 was placed outside of Canada, largely in the United States; remaining contracts went to Dominion firms.

Twenty shipyards are engaged in building 9 war vessels, with production well in advance of schedule. Also under construction are 82 airdromes and 175 other projects, including coastal fortifications, submarine defences and airplane hangars. Motor vehicles totaling 9000 are on order at $14,000,000 cost; 3000 have already been delivered overseas. War munitions totaling $80,000,000 are in process of manufacture, and one large explosive plant is being constructed, another is in course of organization.

Order-in-council, published at Ottawa, empowers Finance Minister Ralston to issue certificates to a $179,760,000 maximum, covering requisitions required in the British Commonwealth air training plan to March 31, 1943. Action was taken to guard against possible handicaps to purchase of airplanes, other necessary equipment. Air program expenditure to March 31, 1941 has been set at $116,658,000, with arrangements being made to accelerate air training scheme's operation.

Contracts numbering 937 and aggregating $15,399,613 were placed last week by munitions and supply department, Ottawa. Mechanical transport facilities, aircraft supplies and machine tool orders formed the bulk of contracts placed.

Dominion Steel & Coal Corp. Ltd., Sydney, N. S., has contracted for disposal of about 15 per cent of its ingot production in United Kingdom, according to Arthur Cross, president. Contract calls for approximately 90,000 tons annually, represents the company's excess ingot production over its own rolling mill capacity. Company's rolling mills, said Mr. Cross, are operating at capacity, not only retaining normal domestic and foreign business but also handling its share of the enhanced market in Great Britain.

1939 Rail Tonnage Nearly Double 1938

■ Steel rail output in 1939 amounted to 1,312,647 net tons, almost double the 697,642 net tons rolled in 1938 and since 1930 was exceeded only in 1936 and 1937, according to figures by the American Iron and Steel institute. Seventeen rail mills operated in 1939, one more than in the previous year. Five were located in Pennsylvania, three in Alabama, two each in Ohio and Indiana and one each in New York, Maryland, West Virginia, Illinois and Colorado.

Nearly half the rails made in 1939, or 620,992 tons, weighed between 100 and 120 pounds per yard, 480,675 tons were between 120 and 136 pounds, 34,375 tons were 136 pounds and over and the remainder were under 100 pounds. Comparisons with previous years follow:

PRODUCTION OF RAILS BY PROCESSES

Net Tons

	Open Hearth						
	Rolled from ingots	Rolled from new seconds, etc.	Bessemer and Electric	Rolled from old rails		Included in Total	
Years					Total	Girder and high tee	Alloy
1920	2,590,280	24,049	160,379	141,902	2,916,610	113,019	14,458
1925	2,999,960	14,881	10,850	93,797	3,119,488	110,454	4,490
1926	3,470,629	10,322	14,037	108,779	3,603,767	130,339	4,722
1927	3,037,761	6,247	1,754	97,502	3,143,264	111,576	1,417
1928	2,882,441	7,317	3,535	71,899	2,965,192	126,728	7,227
1929	2,969,565	12,058	4,714	62,458	3,048,795	122,839	2,201
1930	2,048,640	6,485	2,444	40,452	2,098,021	78,192	5,249
1931	1,268,325	3,492	927	23,937	1,296,681	50,010	597
1932	437,714	2,462	72	10,626	450,874	32,483	633
1933	435,030	10,497	336	20,389	466,252	19,668	489
1934	1,086,879	13,043	2,276	29,253	1,131,451	33,587	1,790
1935	766,820	7,844	633	21,624	796,921	29,053	582
1936	1,317,380	10,017	324	38,507	1,366,228	46,349	502
1937	1,568,931	12,123	700	37,474	1,619,228	43,813	848
1938	675,339	5,471	61	16,771	697,642	19,505	378
1939	1,281,380	6,392	209	24,666	1,312,647	35,618	316

To Commemorate First American Steel Rail

■ Seventy-fifth anniversary of the rolling of the first steel rail in the United States on May 24, 1865, will be commemorated by the Traffic Club of Chicago on June 10 at a luncheon in the Palmer House. Ralph Budd, president, Burlington railroad, and Clarence Randall, vice president, Inland Steel Co., will be featured speakers at the luncheon.

Capt. E. B. Ward's Chicago Rolling Mill will be recalled as having touched off a new era in steelmaking and railroad building when it rolled the first steel rail and as having had a leading part in the great steel expansion that followed. Although various forms of iron rail sections were in use in the eighteenth century, it wasn't until the discovery of the pneumatic process for purification of iron that a steel rail was economically possible. The process, discovered independently by Henry Bessemer in England and William Kelly in this country, attracted Captain Ward's attention who became associated with William Kelly as one of the directors of the Kelly Pneumatic Process Co.

In 1864 the Kelly company built an experimental plant at Wyandotte, Mich., where Ward operated a rolling mill. First American commercial ingots of pneumatic process steel were poured in this mill and one of these ingots was used a few months later in rolling the first steel rail in Chicago.

Ford Will Rebuild River Rouge Furnace

■ Ford Motor Co., Dearborn, Mich., will reline and modernize its "Henry" blast furnace at the River Rouge plant. Reconstruction of the furnace, which has been in continuous operation for six and one-half years, will begin June 15 and should be completed by Aug. 23. Contract for the work has been awarded to Arthur G. McKee Co., Cleveland.

Metal Trades Group Stresses Need For Operator Training Programs

■ URGENCY for developing skilled machine operators to cope with increases in demand for metal products was stressed at the forty-second annual convention of the National Metal Trades association, Hotel Biltmore, New York, on May 21-22.

An acute shortage already exists, members reported, and with emergency action on the new national defense program being urged, an intensive short-range program is imperative. This should supplement a longer term program, it was agreed.

More than 300 heard speakers discuss this and other training and personnel problems. Raymond E. Baldwin, Connecticut governor, and guest speaker at the annual dinner, urged industry and the country at large to make sure that it has a government in which it can place its fullest confidence in what he called more difficult days to come.

Need "Stronger Horse"

The coming election, Governor Baldwin pointed out, would establish the government leadership for at least the next four years. In that period, he predicted, problems confronting us will far surpass anything now being experienced.

"You probably will hear much over the next few weeks," he said, "about the inadvisability of 'swapping horses in the middle of the stream.' My contention is, let's get a stronger horse before getting to the stream."

He charged the present administration has failed miserably in solving the country's domestic problems. "Hence what right have we to believe that it will be any more successful in coping with the still graver problems which loom abroad?" The governor accused the present administration "which is so proud, so boastful of its grasp of foreign affairs, had permitted our national defense to come to such a pass that today we face a dire emergency."

Nelson W. Pickering, president, Farrel-Birmingham Co. Inc., Ansonia, Conn., and retiring president of the association, outlined progress the organization is making in the field of labor relations. He regarded it as significant that while industry generally has not been so fortunate, very few members of the association have been involved in strikes in the past year.

He presented statistics for 1939, remarking that "even in the face of the continuous conservative swing of public opinion against 'wild cat' union organizing activities, the department of labor reported that in that year there were 2613 strikes affecting 1,171,000 employes, the third largest number of strikes in recent years."

A. H. Timmerman
Elected president, National Metal Trades association

This, he continued, was approximately 150 less strikes than in 1938 but about 400,000 more employes were involved than during the preceding year. The strikes in 1939 were approximately half of the total of 4740 which occurred in 1937, when there were more disturbances than in any other year in the history of the United States. For the period of 1933-1939, inclusive, there was a loss of 121,000,000 man-days, on account of strikes, which, calculated on the basis of average earnings of $5 per day, represented a loss to workers alone of approximately $605,000,000.

Discussing management's responsibilities, he said that it was important that top management in every plant stand for a definite, constructive policy in its employe relations. The supervisory force should understand and appreciate the complexity of its job and recognize the part the foreman must play in selling industry to the employe.

Forum Is Held

A feature of the program was a question-and-answer panel relating to various subjects as health programs, job rating, apprenticeship versus specialist training, older employes, credit unions and employe rating. The foreman came in for special attention in a series of questions relating to his compensation and the part the foreman should play in promoting sound industrial relations.

Panel comprised G. W. Cannon, vice president, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.; Col. J. P. Gillard, general superintendent, Cleveland Twist Drill Co., Cleveland; A. L. Fost, assistant general manager, Sargent & Co., New Haven, Conn.; A. W. Hawkes, president, Congoleum-Nairn Inc., Kearny, N. J.; H. H. Kerr, president, Boston Gear Works, North Quincy, Mass.; and N. R. Knox, vice president, Bucyrus-Erie Co., South Milwaukee, Wis.

Asserting mutual understanding is the key to sound employer-employe

relations, William A. Carson, president, Sunbeam Electric Mfg. Co., Evansville, Ind., said it is essential that the employer frankly advise the employe of the company problems and make a point of knowing the problems of the employe.

"Particular concern," he said, "should be directed toward the development of those policies which employes consider most vital to their own particular welfare. These in the order of their importance are: Security of employment, rates and amount of pay, opportunity for advancement, good working conditions."

Noting the disposition of employers to tempt skilled workers from one another, a disposition which always arises in times of labor shortage as at present, Charles H. Edgar, Otis Elevator Co., New York, and chairman of the association's committee on apprenticeship condemned the practice roundly and said that the only true solution to the problem was in the training of men from within a company's own organization.

He said that it not only was not fair to the other employer to take away his skilled men, but that it was costly to the company doing it.

Need Training Programs

Mr. Edgar also stressed the need for development of intensive programs for training specialists in view of the present scarcity and referred to measures being taken by the Warner & Swasey Co., Cleveland, and others in shaping up short-term programs. He urged closer co-operation between industry and civic and state educational interests and said it was important that "top management" of industry become more directly interested in this problem.

A. S. Redway, vice president, Farrel-Birmingham Co. Inc., reported on his company's experience in "Putting Job Rating to Work." A. S. Davis, Dexter Folder Co., Pearl River, N. Y., submitted a preliminary report on the progress of the establishment of a salary rating plan, which, it was believed, will prove particularly useful in rating of supervisory, office and engineering personnel. Howard Goodman, vice president, Goodman Mfg. Co., Chicago, discussed "A Branch Program on Industrial Relations."

A. H. Timmerman, Wagner Electric Corp., St. Louis, was elected president of the association. He succeeds Nelson W. Pickering, president, Farrel-Birmingham Co., Ansonia, Conn.

Roe S. Clark, Package Machinery Co., Springfield, Mass., was named first vice president and H. H. Kerr, Boston Gear Works Inc., North Quincy, Mass., second vice president and treasurer.

Councilors for two years include: Ralph H. Illingworth, Boston, Machine Works Co., Lynn, Mass.; D. P. Sommer, Keystone Steel & Wire Co., Peoria, Ill.; Arthur E. Blackwood, Norton Lasier Co., Chicago; George A. Seyler, The Lunkenheimer Co., Cincinnati; T. H. Doan, The Foote-Burt Co., Cleveland; and R. W. Gillispie, Jeffrey Mfg. Co., Columbus, O.; S. Owen Livingston, Gallmeyer & Livingston Co., Grand Rapids, Mich.; A. E. Newton, The Collins Co., Collinsville, Conn.; N. R. Knox, Bucyrus-Erie Co., South Milwaukee, Wis.; R. G. Wilson, The Challenge Machinery Co., Grand Haven, Mich.; J. L. Kopf, Jabez Burns & Sons Inc., New York; Ernest Dunford, Landis Machine Co., St. Louis; D. Norris Benedict, Frick Co., Waynesboro, Pa.; N. W. Pickering, Farrel-Birmingham Co. Inc., Ansonia, Conn.; and W. F. Newhouse, Saranac Machine Co., Benton Harbor, Mich.

First Quarter Production of Iron and Steel Products for Sale as Analyzed by Institute

		Number of companies	Items	Annual Capacity Net tons	Production for Sale—Net Tons First Quarter - 1940			
					Total	Per cent of capacity	Shipments: Export	Shipments: To members of the industry for conversion into further finished products
Steel Products	Ingots, blooms, billets, slabs, sheet bars, etc.	32	1	xxxxxxx	1,073,843	xxx	316,210	364,615
	Heavy structural shapes	8	2	5,205,300	536,714	41.5	40,746	-
	Steel piling	4	3	328,000	29,178	35.8	3,133	-
	Plates—Sheared and Universal	19	4	5,855,450	880,496	60.5	87,843	10,098
	Skelp	7	5	xxxxxxx	118,204	xxx	20,162	39,548
	Rails—Standard (over 60 lbs.)	4	6	3,647,600	490,614	54.1	21,205	-
	Light (60 lbs. and under)	6	7	306,800	25,180	33.0	6,985	-
	All other (Incl. girder, guard, etc.)	2	8	118,000	10,976	37.4	1,420	-
	Splice bar and tie plates	14	9	1,300,200	166,156	51.4	2,755	-
	Bars—Merchant	35	10	xxxxxxx	1,045,903	xxx	79,151	86,720
	Concrete reinforcing—New billet	14	11	xxxxxxx	226,072	xxx	75,061	-
	Rerolling	18	12	xxxxxxx	27,030	xxx	3,478	-
	Cold finished—Carbon	18	13	xxxxxxx	163,632	xxx	2,477	-
	Alloy—Hot rolled	15	14	xxxxxxx	207,557	xxx	12,924	15,429
	Cold finished	14	15	xxxxxxx	23,496	xxx	490	-
	Hoops and baling bands	5	16	xxxxxxx	21,317	xxx	1,196	-
	TOTAL BARS	53	17	12,355,730	1,715,007	55.8	174,777	102,149
	Tool steel bars (rolled and forged)	15	18	110,220	16,596	60.6	732	-
	Pipe and tube—B. W.	13	19	1,665,860	196,154	47.4	21,060	-
	L. W.	10	20	1,360,360	73,113	21.6	9,822	-
	Electric weld	5	21	731,520	53,719	29.5	6,974	-
	Seamless	15	22	3,347,590	455,401	54.7	45,530	-
	Conduit	5	23	133,145	15,006	45.3	551	-
	Mechanical Tubing	12	24	367,475	52,273	57.2	2,986	-
	Wire rods	19	25	xxxxxxx	253,839	xxx	60,407	38,691
	Wire—Drawn	37	26	2,255,350	336,122	59.9	40,395	5,057
	Nails and staples	19	27	1,001,690	133,441	49.2	14,664	-
	Barbed and twisted	16	28	438,270	41,712	38.3	6,372	-
	Woven wire fence	15	29	772,791	57,518	29.9	612	-
	Bale ties	11	30	119,050	11,331	38.3	45	-
	All other wire products	6	31	27,030	2,286	34.0	-	-
	Fence posts	12	32	145,800	11,429	31.5	230	-
	Black plate	12	33	653,295	91,953	56.6	3,941	31,287
	Tin plate—Hot rolled	9	34	1,201,960	144,319	48.3	51,283	-
	Cold reduced	10	35	2,930,860	554,495	76.1	122,503	-
	Sheets—Hot rolled	26	36	xxxxxxx	1,334,759	xxx	134,978	40,306
	Galvanized	16	37	xxxxxxx	309,137	xxx	45,392	-
	Cold rolled	18	38	xxxxxxx	570,661	xxx	25,875	-
	All other	15	39	xxxxxxx	149,856	xxx	4,679	-
	TOTAL SHEETS	27	40	13,233,770	2,364,413	71.8	210,924	40,306
	Strip—Hot rolled	24	41	3,524,750	350,929	40.0	10,401	41,632
	Cold rolled	35	42	1,305,360	177,088	54.6	4,592	-
	Wheels (car, rolled steel)	5	43	419,035	58,853	56.5	1,649	-
	Axles	5	44	472,280	27,909	23.8	1,350	-
	Track spikes	11	45	327,275	29,595	36.4	1,505	-
	All other	4	46	9,100	3,095	136.8	-	-
	TOTAL STEEL PRODUCTS	133	47	xxxxxxx	10,558,957	xxx	1,302,814	673,383
	Estimated total steel finishing capacity based on a yield from ingots of 68.9 %	-	48	53,714,800	xxxxxxx	74.0	xxxxx	xxxxxxx
	Pig iron, ferro manganese and spiegel	27	49	xxxxxxx	1,309,597	xxx	76,958	357,225
	Ingot moulds	4	50	xxxxxxx	87,238	xxx	453	-
Iron Products	Bars	9	51	160,600	7,974	20.0	34	704
	Pipe and tubes	3	52	109,377	8,647	31.8	370	-
	All other	2	53	71,180	3,294	18.6	810	1,004
	TOTAL IRON PRODUCTS (ITEMS 51 to 53)	11	54	276,247	19,915	29.0	1,214	1,708

Total steel products produced for sale, less shipments to members of the industry for conversion into further finished products: Current Quarter 9,885,574 *N.T.,* 74.0 *% of Finishing Capacity.*
To date _____ *N.T.;* _____ *% of Finishing Capacity.*
The above tonnages represent 68.9 *% of the ingots produced by companies whose products are included above.*

Total number of companies included - 153

MEN of INDUSTRY

■ URLIN K. BECKER, vice president and formerly secretary, Continental Steel Corp., Kokomo, Ind., has been elected treasurer, succeeding the late Niles Chapman. William G. Harter has been made secretary, also retaining the position of assistant treasurer. Garland L. Rathel, purchasing agent of Continental since its formation, has been named vice president in charge of purchases.

D. A. Williams, president, has been made chairman, executive committee, a position held by the late Mr. Chapman, and Mr. Becker becomes a member of the committee to fill the vacancy created by Mr. Chapman's death.

Mr. Becker has been identified with the steel industry about 32 years. When Continental Steel was incorporated in 1927, Mr. Becker was chosen secretary, becoming assistant treasurer in 1930, vice president in 1931, and a director in 1933.

Mr. Harter's first association with the steel industry began 18 years ago, when he joined the engineering department of Chapman Price Steel Co., Indianapolis. A year after formation of Continental he was transferred to Kokomo, serving successively as assistant purchasing agent; credit manager, and assistant treasurer.

Mr. Rathel has a record of 27 years in the steel industry, most of this period being spent in the purchasing side of the business.

♦

E. L. Parsons has been appointed sales manager, Winfield H. Smith Inc., Springville, N. Y.

♦

George M. Alexander, formerly associated with the John Wahl Commission Co., St. Louis, recently dissolved, has been named St. Louis district representative for the George Birkenstein Corp., Chicago.

♦

E. J. Parker has been elected president, Howard Aircraft Corp., Chicago, succeeding Ben O. Howard, resigned. Mr. Parker formerly was with the Fisher Body division of General Motors Corp.

♦

Charles E. S. Dickerson has been appointed manager of sales of cold finished steel bars, Edgar T. Ward's Sons Co., Pittsburgh. He has been associated with the company in an executive capacity since January of this year, and before that was president and general manager, Miami-Dickerson Steel Co., Dayton, O. He began his career in the steel industry in 1928, joining Dickerson Steel Co., Dayton, and shortly became vice president and general manager. In August, 1936, when that firm was combined with Miami Iron & Steel Co., Dayton, to form Miami-Dickerson Steel Co., he became president and general manager. Mr. Dickerson has also served as secretary, vice president and president of the Cincinnati chapter, American Steel Warehouse association.

Urlin K. Becker

William G. Harter

Garland L. Rathel

♦

James F. McNamara, manager of monel and rolled nickel sales, International Nickel Co., New York, and J. E. Baker, vice president, Blair & Co. Inc., New York, have been named directors, Harvil Aircraft Die Casting Corp., Los Angeles.

♦

Otto L. Lehecka, formerly with Latrobe Electric Steel Co., Latrobe, Pa., has been appointed sales representative for Braeburn Alloy Steel Corp., Braeburn, Pa., and will be associated with Braeburn's Cleveland office.

♦

James H. Herron, president, James H. Herron Co., Cleveland, has been made an honorary member, Cleveland Engineering society. He is a past president of the society and a past president, American Society of Mechanical Engineers.

♦

E. J. Eldridge has resigned as traffic manager, Truscon Steel Co., Youngstown, O., to become traffic manager, Certain-Teed Products Corp., New York. Mr. Eldridge served Truscon 12 years and also was director of purchases.

♦

J. A. St. Clair has been made chief sales engineer, industrial division, E. C. Atkins & Co., Indianapolis. The past several years he has worked as engineer in the engineering department and was in charge of the service department.

♦

James C. Stewart, president, James Stewart & Co., New York, has been elected chairman of the board. Harry D. Watts, heretofore executive vice president, becomes president, and Roger Peabody, vice president, has been named a director.

♦

Charles G. McCabe has joined the technical staff of Battelle Memorial institute, Columbus, O., and will assist in work being undertaken on the chemistry of the open-hearth steel process. He has had ten years open-hearth experience with American Rolling Mill Co., Middletown, O.

♦

W. B. Coullie, assistant to the president and general sales manager, Harbison-Walker Refractories

Co., Pittsburgh, has been elected vice president. He has been identified with the sales division of the company 34 years. H. S. Robertson, formerly an assistant general sales manager, has been named general sales manager.

♦

A. L. Moses, formerly vice president and sales manager, Great Lakes Forge Co., Chicago, has been elected vice president, American Forge division, American Brake Shoe & Foundry Co., with offices in the New Center building, Detroit.

♦

O. P. Robinson, heretofore associated with the Chicago sales office of Cutler-Hammer Inc., Milwaukee, has been transferred to the company's Pittsburgh sales engineering staff. Mr. Robinson is an electrical engineering graduate of Armour Institute of Technology, Chicago, and a member, Association of Iron and Steel Engineers.

♦

C. R. Hale has been named purchasing agent, Air Reduction Co., New York, and its subsidiary and affiliated companies. He succeeds H. M. Daggett, retired. Mr. Hale, a graduate of Columbia university, joined the purchasing department of Air Reduction in 1925, and has been assistant purchasing agent since 1936.

♦

Charles N. Fitts, of Boston, has been elected an honorary member, American Institute of Steel Construction, New York. Until his retirement last year, Mr. Fitts was a director of the institute from the time it was organized, and was a member of the executive committee the past ten years. He also served as president from 1928 to 1932. Mr. Fitts was treasurer, New England Structural Co. from 1895 until its liquidation in 1939.

♦

J. Roy Porter, since 1928 president, Marshall & Huschart Machinery Co., Chicago, was named chairman of the board recently at a banquet honoring his 50 years of service to the machine tool industry. George Habicht Jr., heretofore assistant to Mr. Porter, has become president and general manager. Frank Seese, secretary-treasurer, has relinquished his duties as secretary to his former assistant, C. P. Stollstorff, who becomes secretary and remains assistant treasurer.

♦

Arthur S. Knoizen, vice president, Jov Mfg. Co., Franklin, Pa., was elected chairman, manufacturers' division, American Mining congress, at a meeting held during the recent coal show in Cincinnati. The following were named to other offices in the division: First vice chairman, E. J. Burnell, Link-Belt Co., Chicago; second vice chairman, E. F. Carley, E. I. du Pont de Nemours & Co., Wilmington, Del.; third vice chairman, J. W. Haddock, Sullivan Machinery Co., Michigan City, Ind.

♦

J. R. Kumer has been appointed manager of stainless bar and wire sales, Allegheny Ludlum Steel Corp., Pittsburgh. Mr. Kumer entered the steel business in 1919 with Union Steel Casting Co., Pittsburgh, with which firm he was associated until joining the former Allegheny Steel Co. in 1926. In 1933 Mr. Kumer was placed in charge of the general sales department, and in 1939 was promoted to assistant manager of sales, stainless bar and wire products of Allegheny Ludlum.

♦

Max W. Lightner has been named assistant to general superintendent, Homestead, Pa., works, Carnegie-Illinois Steel Corp. He was formerly chief metallurgist at Homestead.

C. R. Hale

Mr. Lightner, who received degrees in metallurgy from Pennsylvania State college and Carnegie Institute of Technology, began his corporation service as an assistant metallurgist at Homestead in 1933. He was made assistant chief metallurgist in 1934, became assistant superintendent of open hearth No. 4 in 1936, and chief metallurgist in 1937.

♦

E. V. Creagh, sales promotion manager, American Chain & Cable Co., Bridgeport, Conn., has been re-elected president, Industrial Advertising and Marketing council, a chapter of the National Industrial Advertisers association. Other officers elected are: A. W. Tucker, Henry G. Thompson & Sons Co., New Haven, Conn., re-elected first vice president; D. M. Davidson, Fafnir Bearing Co., New Britain, Conn., second vice president; and Galen Snow, Snow, Bates & Orme Inc., Springfield, Mass., re-elected secretary-treasurer. Alexis Doster, Torrington Mfg. Co., Torrington, Conn., and E. N. Bidwell, Whitney Chain Co., Hartford, Conn., have been elected directors for a term of two years.

♦

Warren W. Scherer has been appointed superintendent of industrial relations, and Arthur M. Krieger, superintendent of maintenance, Irvin works, Carnegie-Illinois Steel Corp. Other promotions at Irvin works are: John A. Drgon, assistant superintendent of maintenance; Thomas W. Hunter, assistant division superintendent, flat products finishing; Charles A. Larkin, general foreman, cold reduction; William Springfield, lubrication foreman, maintenance; and John Sturdy, maintenance foreman, flat products finishing.

♦

Directors of Sharon Steel Corp., Sharon, Pa., recently made the following title changes among its officers: Position of secretary-treasurer has been split, J. Reid Evans, who served many years with the dual title, being named treasurer, and A. J. Watson, assistant secretary being elected secretary.

Mason Evans Jr. was elected assistant treasurer, and G. R. Johnston, auditor, was named assistant secretary and auditor.

J. H. Carter was elected operating vice president to succeed J. Milton Hughes, recently transferred to the corporation's Pittsburgh office.

M. F. Coon has been made assistant chief engineer, serving both the Sharon and Lowellville plants.

♦

E. J. Skinner, associated with Renown Stove Co., Owosso, Mich., 31 years, working in various departments, has been named factory superintendent. He succeeds the late Claude J. Sperry. The past several years Mr. Skinner has been assistant factory superintendent.

♦

Pierre S. du Pont, 70, has retired as chairman of the board, E. I. du Pont de Nemours & Co., Wilmington, Del., after 21 years in that position. Succeeding to the chairmanship is Lammot du Pont, 59, who has resigned from the presidency he held since 1926. Walter S. Carpenter Jr., 52, has resigned as chairman of the executive committee to become president, the second man other than a Du Pont to head the company in its 138-year history.

Irenee du Pont, 63, has resigned as vice chairman, but with his oldest brother, will continue a member of the board and the finance committee.

Angus B. Echols, vice president, has become chairman, finance committee, and J. B. Eliason, treasurer, has also been elected a vice president and director.

Activities of Steel Users, Makers

■ WESTINGHOUSE ELECTRIC & Mfg. Co. will expand its household refrigerator capacity at Mansfield, O., by 33 per cent in a program to cost over $500,000. A new metal stamping building 70 x 360 feet 3 stories, designed by Albert Kahn Inc., Detroit, will be erected beside the present vitreous enameling plant. Porcelain-enameled parts manufactured in this building will be carried by conveyor through a 1220-foot overhead bridge, to be completed soon, to the assembly line in the main building.

In addition, a third and fourth story, 80 x 80 feet, will be built atop the wire goods building to increase production facilities for refrigerator wire shelves.

Work on the foundation will start in June and structural work in July. Program will be completed early in September and production should begin in November. General contractor will let bids within three weeks.

♦

Gedson Steel Products Co. Inc., New York, has been formed by W. F. Evans to engage in export business in iron and steel products, with offices at 67 West Forty-fourth street. Mr. Evans, in the export business 30 years, was formerly associated with American Steel Export Co. and Pennsylvania Steel Products Co.

♦

Sawhill Mfg. Co. has moved its offices and plant from Bridgeville to Wheatland, Pa.

♦

Cutler-Hammer Inc., Milwaukee, has moved its Minneapolis office and warehouse to larger quarters at 532 South Seventh street.

♦

Fire-Brick Engineers Inc., Milwaukee, has been appointed sales representative in Wisconsin for Charles Taylor Sons Co., Cincinnati.

♦

Kaukauna Machine Corp., Kaukauna, Wis., manufacturer of machine tool castings and machine tools, has been licensed to use the Sorbo-Mat process, by Sorbo-Mat Process Engineers, St. Louis.

♦

Cowles Detergent Co., Cleveland, maker of industrial alkalies and soaps, has appointed Mau-Sherwood Supply Co., Cleveland, distributor for its line of metal cleaners in northern Ohio and northwestern Pennsylvania.

♦

New England Metallurgical Corp., South Boston, Mass., specializing in heat treatment of steel, has purchased the Greenman Steel Treating Co., Worcester, Mass., and will continue operations at the latter plant. A. Dudley Bach, president of the parent and subsidiary organizations, will be in charge of both plants, L. P. Greenman, retiring.

♦

Welding table and positioner division of Ransome Concrete Machinery Co., Dunellen, N. J., has appointed the following representatives to handle its line of welding tables and positioners: Arcway Equipment Co., Philadelphia, covering Pennsylvania, Delaware, West Virginia, Maryland, Virginia and part of New Jersey; Hobart Welder Sales & Service, Cleveland, covering northeastern Ohio.

Died:

■ GEN. OTTO H. FALK, 74, chairman of the board, Allis-Chalmers Mfg. Co., Milwaukee, May 21 in Milwaukee. He had been ill since last fall of a heart ailment. Born in Milwaukee, June 18, 1865, General Falk attended the German-English academy there and Northwestern college at Watertown, after which he enrolled in Allen Military academy, Chicago, and was graduated a captain. The early years of General Falk's life were devoted to a military career, and he advanced rapidly in the national guard until he reached the rank of brigadier general in 1911. He then retired to enter industry, and in 1912 was appointed receiver for the old Allis-Chalmers Co. A year later he was elected president of the reorganized company, and some years ago was made board chairman. General Falk was an active figure in Wisconsin's civic affairs; was a director, First Wisconsin National bank and affiliated corporations, a director of Wisconsin Manufacturers association, and an officer and director in many other organizations.

Gen. Otto H. Falk

♦

Walter T. Lamb, 51, manager, Kewanee Iron & Metal Co., Kewanee, Ill., in that city, recently.

♦

Haddon G. Carlson, 45, the past 17 years purchasing agent, Milcor Steel Co., Milwaukee, May 19 in Milwaukee.

♦

James W. Watson, 50, transportation manager, Monroe, Mich., plant of Republic Steel Corp., Cleveland, in Monroe, May 4.

♦

James H. Cranwell, 83, retired industrialist, May 15 in Baltimore. He was in charge of the Baltimore division of Continental Can Co. from 1917 to 1928 when he retired.

♦

Percy H. Knight, 72, a retired employe of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., at his home in Costa Mesa, Calif., May 4. He had been with the company 40 years.

♦

S. C. Rebman, vice president and general sales manager, Jersey Shore Steel Co., Jersey Shore, Pa., May 9. Mr. Rebman was associated with the steel and steel tube business over 40 years.

♦

J. E. Hamilton, 88, founder, Hamilton Mfg. Co., Two Rivers, Wis., and chairman of the board, Aluminum Goods Mfg. Co., Two Rivers and Manitowoc, Wis., recently in Pasadena, Calif., where he had lived since retirement from the chairmanship of the Hamilton company four years ago.

♦

Conrad M. Conradson, inventor and machine tool designer, May 20 in Detroit. He was associated with Vickers Inc., Detroit, as consulting engineer. He is credited with being one of the early originators to apply the hydraulic principle in machine tool designing, obtaining his first patent on the process 40 years ago.

♦

John Milton McKinley, 57, vice president in charge of operations, North American Refractories Co., Cleveland, May 19 in that city. Prior to becoming identified with the fire brick industry in 1910, he was associated with the former Carnegie Steel Co. at Clairton, Pa., where he advanced from draftsman to superintendent of construction. He had been with North American Refractories since 1929.

1939 Production of Steel Ingots, Castings and

All Figures in Net Tons

ANNUAL STEEL PRODUCTION (Ingots and steel for castings)

Years	Open hearth			Bessemer	Crucible	Electric	Total
	Basic	Acid	Total				
1910	17,127,408	1,357,642	18,485,050	10,542,305	136,979	61,975	29,226,309
1915	24,985,772	1,534,822	26,520,594	9,281,678	127,436	79,452	36,009,160
1920	35,140,810	1,451,712	36,592,522	9,949,057	80,937	566,370	47,188,886
1925	41,537,823	1,060,804	42,598,627	7,530,837	21,910	689,373	50,840,747
1929	52,900,309	1,254,926	54,155,235	7,977,210	7,442	1,065,603	63,205,490
1930	38,380,514	874,559	39,255,073	5,639,714	2,523	686,111	45,583,421
1931	24,786,046	424,668	25,210,714	3,386,259	1,733	460,255	29,058,961
1932	13,151,804	184,406	13,336,210	1,715,925	722	270,044	15,322,901
1933	22,464,004	363,469	22,827,473	2,720,246	763	471,747	26,020,229
*1934	26,047,187	307,651	26,354,838	2,421,840	595	404,651	29,181,924
1935	34,004,585	396,695	34,401,280	3,175,235	719	606,471	38,183,705
1936	48,288,605	471,858	48,760,463	3,873,472	914	865,150	53,499,999
1937	51,265,211	559,768	51,824,979	3,863,918	1,046	947,002	56,636,945
1938	28,774,999	305,017	29,080,016	2,106,340	7	565,627	31,751,990
1939	47,828,700	581,100	48,409,800	3,358,916	931	1,029,067	52,798,714

ANNUAL STEEL INGOT PRODUCTION

Years	Open hearth			Bessemer	Crucible	Electric	Total
	Basic	Acid	Total				
1910	16,641,355	876,742	17,518,097	10,476,969	120,592	56,919	28,172,577
1915	24,612,696	1,084,326	25,697,022	9,178,105	110,909	52,281	35,038,317
1920	34,637,560	850,194	35,487,754	9,831,480	79,000	388,925	45,787,159
1925	41,027,907	543,024	41,570,931	7,470,544	19,857	376,295	49,437,627
1929	52,241,511	645,560	52,887,071	7,942,681	6,454	596,279	61,432,485
1930	37,966,340	411,243	38,377,583	5,623,058	1,751	344,308	44,346,700
1931	24,625,365	217,715	24,843,080	3,372,761	931	263,621	28,480,393
1932	13,092,235	117,369	13,209,604	1,711,969	270	158,287	15,080,130
1933	22,369,542	218,954	22,588,496	2,716,872	447	335,785	25,641,600
1934	26,023,970	225,202	26,249,172	2,421,840	595	390,986	29,062,593
1935	33,974,575	278,333	34,252,908	3,175,235	719	584,436	38,013,298
1936	48,239,427	311,815	48,551,242	3,873,472	914	788,718	53,214,346
1937	51,205,848	373,490	51,579,338	3,863,918	1,046	912,027	56,356,329
1938	28,746,725	218,227	28,964,952	2,106,340	7	524,843	31,596,142
1939	47,788,763	437,307	48,226,070	3,358,916	931	951,522	52,537,439

PRODUCTION OF DUPLEX STEEL

Years	Net tons	Years	Net tons	Years	Net tons
1915	1,995,270	1931	1,059,345	1936	2,350,994
1920	3,672,613	1932	323,975	1937	3,256,837
1925	3,132,996	1933	432,492	1938	1,325,658
1929	3,316,647	1934	662,338	1939	2,317,382
1930	2,290,710	1935	1,075,222		

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS

Years	Ingots	Castings	Total	Years	Ingots	Castings	Total
1910	603,077	32,880	635,957	1933	1,652,448	80,397	1,732,845
1915	1,034,041	109,644	1,143,685	*1934	1,787,009	18,739	1,805,748
1920	1,782,972	76,555	1,859,527	1935	2,337,918	36,099	2,374,017
1925	2,598,837	126,093	2,724,930	1936	3,122,672	106,985	3,229,657
1929	4,216,001	216,071	4,432,072	1937	3,332,670	63,871	3,396,541
1930	2,595,245	141,263	2,736,508	1938	1,606,977	46,533	1,653,510
1931	1,529,931	100,692	1,630,623	1939	3,120,859	91,096	3,211,955
1932	848,467	45,969	894,436				

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS BY PROCESSES

Years	Open hearth			Bessemer	Crucible	Electric	Total
	Basic	Acid	Total				
1929	3,629,393	120,968	3,750,361	107,870	2,607	571,234	4,432,072
1935	1,829,566	82,208	1,911,774	.....	172	462,071	2,374,017
1936	2,508,671	129,658	2,638,329	.....	234	591,094	3,229,657
1937	2,559,200	164,455	2,723,655	.....	270	672,616	3,396,541
1938	1,179,031	102,089	1,281,120	13	5	372,372	1,653,510
1939	2,302,273	156,581	2,458,854	3,486	231	749,384	3,211,955

*The figures for 1934 and subsequent years include only that portion of the steel for castings which was produced in foundries operated by companies producing steel ingots.

PRODUCTION OF TIN PLATE AND TERNE PLATE

Years	Tin plate	Terne plate	Total
1920	1,539,976	39,984	1,579,960
1925	1,729,288	45,532	1,774,820
1929	2,034,170	43,503	2,077,673
1930	1,859,564	23,055	1,882,619
1931	1,559,294	17,451	1,576,745
1932	1,104,563	12,188	1,116,751
1933	1,888,125	21,245	1,909,370
1934	1,683,268	36,941	1,720,209
1935	1,898,578	98,382	1,996,960
1936	2,355,531	142,303	2,497,834
1937	2,708,373	161,610	2,869,983
1938	1,601,679	127,827	1,729,506
1939	2,505,636	181,537	2,687,173

PRODUCTION OF HOT ROLLED IRON AND STEEL PRODUCTS BY STATES

States	1935	1936	1937	1938	1939
Maine, Mass., Rhode Island, Conn.	222,645	276,546	258,610	151,829	240,358
New York	1,074,186	1,612,842	2,051,368	1,087,130	1,868,642
New Jersey	105,389	124,373	126,562	84,030	119,639
Pennsylvania	7,304,097	11,235,879	12,507,869	6,583,138	11,024,195
Delaware, Md., Va.	1,094,644	1,531,053	1,980,982	1,453,271	2,206,873
West Virginia	1,170,457	1,334,371	1,260,428	812,768	1,364,430
Kentucky, Tenn., Ga., Texas	640,340	737,812	666,098	411,483	605,385
Alabama	815,797	1,217,904	1,420,356	1,121,256	1,665,451
Ohio	6,050,182	8,620,971	8,685,531	5,200,010	8,609,872
Indiana	3,669,923	4,962,821	5,484,020	2,899,327	4,996,518
Illinois	2,117,081	2,811,479	3,103,713	1,523,309	2,721,429
Michigan, Wis., Minn.	1,643,445	1,913,984	2,218,543	1,274,028	2,080,614
Missouri, Okla.	225,523	353,574	323,465	216,751	376,510
Colorado, Wash.	317,848	598,677	610,458	286,271	606,531
California, Canal Zone	388,741	525,258	480,353	399,230	517,109
Total	26,840,298	37,857,544	41,178,356	23,503,831	39,003,556

PRODUCTION OF HOT ROLLED IRON AND STEEL PRODUCTS IN 1939

	Net tons
Flat Rolled Products:	
Plates (sheared and universal)	3,101,981
Sheets	9,978,637
Strip	1,826,696
Hoops	72,971
Cotton ties and baling bands	34,580
Strip and sheets for cold reduced black plate and tin plate	2,662,193
Black plate	795,607
Total	18,472,665
Bars:	
Merchant	4,871,891
Concrete reinforcement	1,266,459
Total Bars	6,138,350
Structural shapes	3,358,985
Sheet piling	158,296
Rails	1,312,647
Long splice bars, tie plate bars, etc.	519,075
Skelp	2,330,128
Blanks or pierced billets for seamless tubes	2,018,502
Wire rods	3,680,297
Car wheels (rolled steel)	148,382
Cross ties	14,692
Rolled forging blooms, billets and axle blanks	600,566
Blooms, billets, slabs and sheet bars for export	150,377
All other finished hot rolled products	100,594
Total	14,392,541
Grand total	39,003,556

Finished Products, Announced by Steel Institute

All Figures in Net Tons

PRODUCTION OF FLAT HOT ROLLED PRODUCTS BY CLASSES

	1936	1937	1938	1939
PLATES:				
Universal	758,015	936,573	382,629	690,128
Sheared	2,071,935	2,695,865	1,537,206	2,411,853
TOTAL	2,829,950	3,632,438	1,919,835	3,101,981
Black sheets	7,835,413	8,780,247	5,314,869	9,978,637
Hoops	122,392	115,284	74,578	72,971
Cotton ties and baling bands	42,315	70,017	38,127	34,580
Strip	3,611,906	3,243,028	1,153,861	1,826,696
Strip and sheets for cold reduced black plate and tin plate	.....	.....	1,815,294	2,662,193
TOTAL	11,612,026	12,208,576	8,396,729	14,575,077
BLACK PLATE:				
For tinning and terne plate	2,557,384	2,923,631	702,778	670,729
All other	387,848	384,945	88,732	124,878
TOTAL	2,945,232	3,308,576	791,510	795,607
GRAND TOTAL	17,387,208	19,149,590	11,108,074	18,472,665

PRODUCTION OF PLATES, SHEETS AND STRIP BY SIZES

	1936	1937	1938	1939
	(a)	(a)	(a)	(a)
UNIVERSAL PLATES:				
Over 6" to 48" wide—¼" and thicker	673,270	839,766	345,843	615,067
Over 48" wide—0.1875" and thicker	84,745	96,807	36,786	75,061
TOTAL	758,015	936,573	382,629	690,128
SHEARED PLATES:				
Over 6" to 48" wide—¼" and thicker	759,750	849,060	464,050	762,011
Over 48" wide—0.1875" and thicker	1,312,185	1,846,805	1,073,156	1,649,842
TOTAL	2,071,935	2,695,865	1,537,206	2,411,853
Black sheets (c)	.....	.....	5,314,869	9,978,637
STRIP (d):				
To and including 6" in width	1,130,609	1,030,934	504,535	980,740
Over 6" and including 24" in width	2,481,297	2,212,094	649,326	845,956
TOTAL	3,611,906	3,243,028	1,153,861	1,826,696

(a) New classification adopted January 1, 1938.

(b) Over 6" to and including 12" from January 1, 1938.

(c) Hot-rolled sheets—3½" and less in width by 0.0254" and less in thickness; over 3½" to 6" inclusive in width by 0.0343" and less in thickness; over 6" to 12" inclusive in width by 0.0567" and less in thickness; over 12" to 32" in width by 0.2499" to 0.0142" inclusive in thickness; over 32" to 48" inclusive in width by 0.2499" and less in thickness; over 48" in width by 0.1874" and less in thickness.

(d) Hot-rolled strip—3½" and less in width by 0.2499" to 0.0255" inclusive in thickness; over 3½" to 6" inclusive in width by 0.2499" to 0.0344" inclusive in thickness; over 6" to 12" inclusive by 0.2499" to 0.0568" inclusive in thickness.

PRODUCTION OF IRON AND STEEL MERCHANT BARS

Years	Total	Years	Total
1920	6,865,869	*1936	5,670,502
1925	6,338,433	*1937	5,809,108
1929	7,235,084	*1938	2,607,181
1930	4,627,810	*1939	4,871,891
*1935	4,142,944		

*Includes bolt, nut and rivet, spike and chain, toe calk, horseshoe, finger, staybolt and all other miscellaneous bars which in 1933 and prior years were included in "all other" miscellaneous hot rolled products.

PRODUCTION OF IRON AND STEEL CONCRETE REINFORCEMENT BARS

Years	Rolled from new steel	Rolled from old material	Total
1920	*	*	641,138
1925	*	*	917,937
1929	*	*	1,079,232
1930	764,603	187,566	952,169
1935	453,950	170,293	624,243
1936	918,985	233,005	1,151,990
1937	758,527	187,377	945,904
1938	727,173	150,569	877,742
1939	1,049,793	216,666	1,266,459

*Data not available.

PRODUCTION OF HEAVY AND LIGHT STRUCTURAL SHAPES

Years	Heavy shapes	Light shapes	Total
1929	4,542,289	809,093	5,351,382
1930	3,372,149	561,821	3,933,970
1935	1,460,047	499,662	1,959,709
1936	2,482,277	763,069	3,245,346
1937	2,852,172	817,896	3,670,068
1938	1,653,648	429,037	2,082,685
1939	2,677,967	681,018	3,358,985

PRODUCTION OF NAILS

Years	Wire nails	Cement coated wire nails (a)	Cut nails and cut spikes
1929	655,052	105,937	26,692
1930	478,071	75,406	22,996
1935	443,596	52,301	19,748
1936	595,999	70,738	26,314
1937	543,329	70,494	24,425
1938	481,980	46,733	19,662
1939	673,914	65,705	24,913

(a) Included in production of wire nails.

PRODUCTION OF SEAMLESS, LAP-WELD, BUTT-WELD, AND ELECTRIC-WELD PIPE AND TUBES IN 1939

SEAMLESS PIPE AND TUBES*

	Standard pipe	Line pipe	Oil country goods	Boiler tubes	Mechanical tubes	Miscellaneous	Total
Hot finished†	117,957	444,778	857,278	96,326	78,167	17,053	1,611,559
Cold drawn	5,323	788	1,948	26,431	84,045	5,117	123,652
Total	123,280	445,566	859,226	122,757	162,212	22,170	1,735,211

LAP-WELD, BUTT-WELD AND ELECTIC-WELD PIPE AND TUBES*

Lap-weld ¶	202,530	100,376	49,972	16,832	.....	11,996	381,706
Butt-weld ¶	1,104,766	33,181	42	.....	.....	41,505	1,179,494
Electric-weld ¶	134,076	61,833	140,843	.....	68,645	62,464	467,861
Total	1,441,372	195,390	190,857	16,832	68,645	115,965	2,029,061

*Production of black pipe, including stainless steel pipe and black pipe subsequently galvanized, sherardized, or enameled.

†Does not include hot finished tubes subsequently cold drawn.

¶Includes Iron and Steel.

EDITORIAL

Manufacturers Are Puzzled

■ MANY manufacturers throughout the country are deeply concerned over the part they will be expected to play in the execution of the national defense program. They would like to be able to make policies with respect to their activities in the immediate and near future. They are handicapped by a setup which makes it extremely difficult to get—from responsible representatives of the government—adequate answers to the questions they have in mind.

Last week's developments at Washington afford very little encouragement to those who favor quick and efficient action in a matter so vitally important as the national defense.

The President stated that a three-point policy would govern execution of the defense program. Not a single war millionaire will be created in this country, he declared, as a result of the war disaster. Labor will not be allowed to take advantage of its collective power by fomenting strikes and squeezing higher wages from employers in the so-called war industries. Under no circumstances will the administration sanction a weakening of the social legislative gains of the past seven years. Labor standards prescribed in the Walsh-Healey act and the wages-hours law must not be relaxed in the name of national defense, the President said.

Business Experts To Be Enlisted In Defense Program Development

Among last week's moves to strengthen the national defense effort was the navy's authorization of a 48-hour work week in navy yards, and the hiring of 15,000 more civilian employes. Congress went into action to provide as soon as possible the necessary funds. John L. Lewis served notice that CIO would organize the airplane industry and all others having to do with national defense. The President said he hoped for a 40 or 42-hour work-week as standard in the national defense program, with as little overtime as possible, so as to provide maximum employment for idle workers.

In the near future, said the President, he would call to Washington a number of industrial and other experts to aid the government in carrying out the defense program. He rejected suggestions that he might set up something resembling the war industries board of 1918. There is no blueprint, he explained, that could describe the type of organization he has in mind.

Another highlight last week was the President's expressed desire to strengthen the country against "fifth column" activities. Another was the joint conclusion, at a conference participated in by the President, members of congress and representatives of the army and navy, that two to three years would be required to develop adequate facilities for training air pilots in sufficient numbers and that development of the necessary air bases would require three to five years.

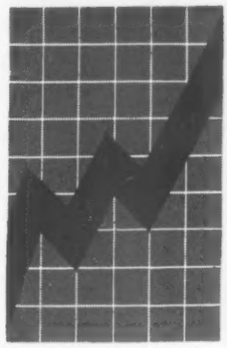
Situation Confused but Industry Is Ready To Mesh with National Plan

Adding up all these different factors that affect the national defense program, we get a confused and rather discouraging picture. Just what we are going to do, how we are going to do it, who is going to do it, how soon we will get started, are not at all clear at the moment. It seems that certain groups—CIO, for example—have a vested interest in the program.

The present situation recalls that which has prevailed in France over the past decade, when national defense work was made to conform to the demands of the communist and labor fronts. History undoubtedly will have much to reveal about the extent to which this situation made it possible for the Germans to cut through to the English channel on the eleventh day of their drive on the Western front.

American industry is ready to mesh into the national defense program as soon as it knows what it is to do.

The BUSINESS TREND



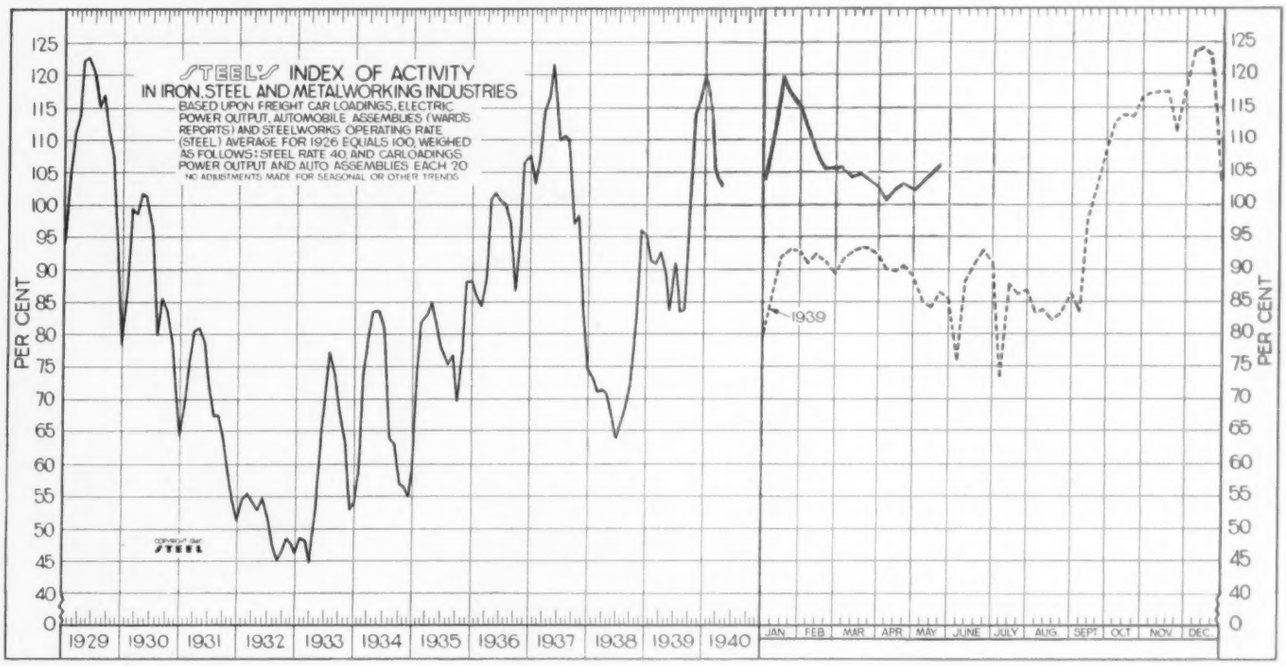
Index Registers Third Consecutive Weekly Gain

■ INDUSTRIAL activity recorded further gains during the past week, with advances developing in steelmaking operations, electric power consumption and in a number of other lines.

Another encouraging factor in the current outlook is the expansion of activity in the aircraft and machine tool industry. The rearmament program recently requested by President Roosevelt is expected to materially expand the large backlog of orders already accumulated in the shipbuilding, aviation and machine tool industries.

STEEL'S index of activity in the iron, steel and metalworking industries recorded the third consecutive weekly increase during the period ended May 18. The index now stands at 106.8, a gain of 2 points over the 104.8 level recorded in the previous period and is well above the 86.6 index figure registered at this time a year ago. In the corresponding weeks of 1938 and 1937, the index stood at 67.1 and 122.2 respectively.

Steelmaking operations during the week ended May 18 advanced 3½ points to 70 per cent, the highest level since the week ended Feb. 10, and still further improvement is indicated over the coming weeks.


STEEL INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARDS REPORTS) AND STEELWORKS OPERATING RATE (STEEL) AVERAGE FOR 1926 EQUALS 100, WEIGHED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
1939
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

STEEL'S index of activity gained 2 points to 106.8 in the week ended May 18:

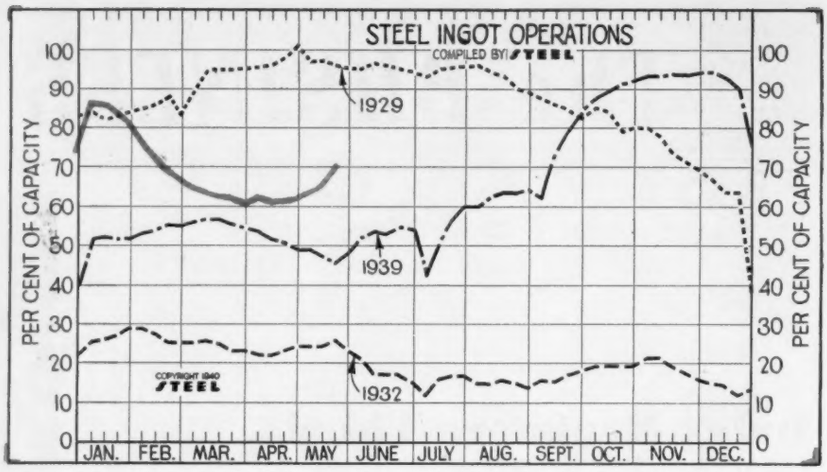
Week Ended	1940	1939
Mar. 9	104.7	92.7
Mar. 16	104.9	93.3
Mar. 23	103.7	93.2
Mar. 30	103.2	92.2
Apr. 6	101.8	90.0
Apr. 13	102.7	89.7
Apr. 20	103.4	90.4
Apr. 27	102.8	89.2
May 4	103.3	85.1
May 11	104.8	84.2
May 18	106.8	86.6

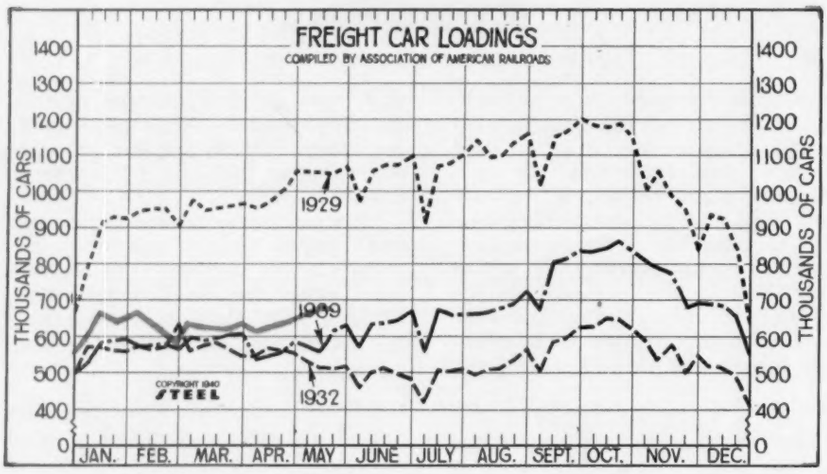
Mo. Data	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	104.1	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
May	.....	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
June	.....	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	.....	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	.....	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Sept.	....	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Oct.	....	114.0	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Nov.	.....	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
Dec.	....	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

Steel Ingot Operations

(Per Cent)

Week ended	1940	1939	1938	1937
Feb. 17....	69.0	55.0	31.0	83.0
Feb. 24....	67.0	55.0	30.5	84.0
Mar. 2....	65.5	56.0	29.5	86.0
Mar. 9....	63.5	56.5	30.0	87.0
Mar. 16....	62.5	56.5	32.0	89.0
Mar. 23....	62.5	55.5	35.0	90.0
Mar. 30....	61.0	54.5	36.0	91.5
Apr. 6....	61.5	53.5	32.0	91.5
Apr. 13....	61.0	51.5	32.0	91.5
Apr. 20....	61.5	50.5	32.5	91.5
Apr. 27....	61.5	49.0	32.0	91.0
May 4....	63.5	49.0	31.0	91.0
May 11....	66.5	47.0	30.0	89.0
May 18....	70.0	45.5	30.0	91.5





Freight Car Loadings

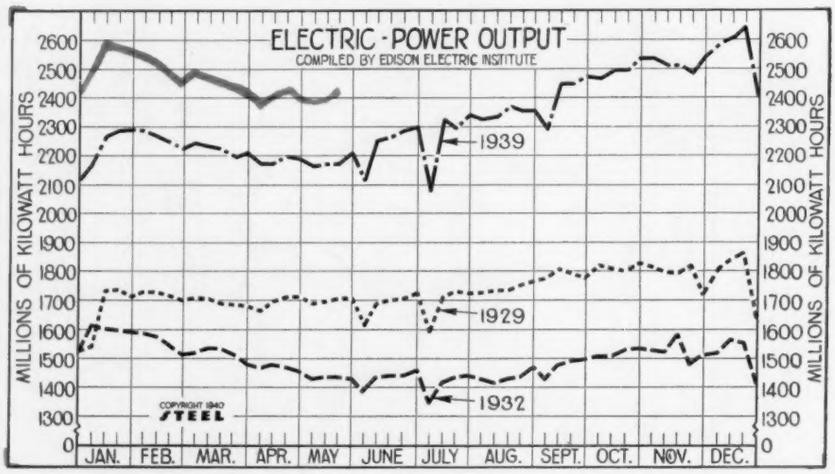
(1000 Cars)

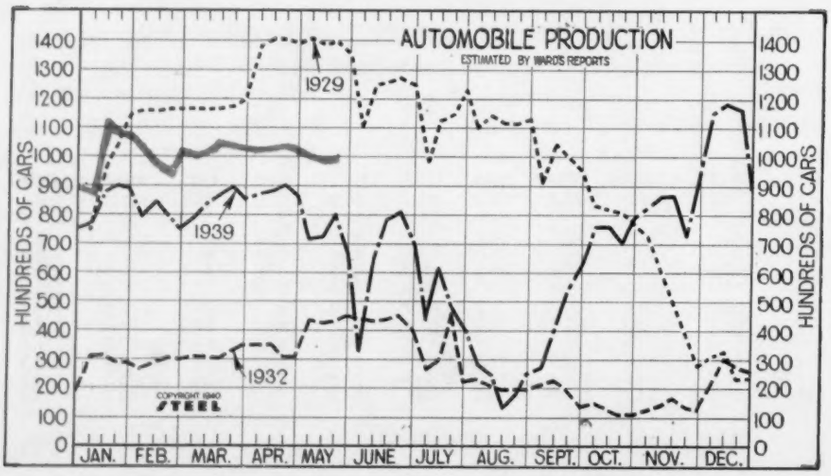
Week ended	1940	1939	1938	1937
Feb. 17.....	608	580	536	715
Feb. 24.....	595	561	512	697
Mar. 2.....	634	599	553	734
Mar. 9.....	621	592	557	749
Mar. 16.....	619	595	540	759
Mar. 23.....	620	605	573	761
Mar. 30.....	628	604	523	727
Apr. 6.....	603	535	522	716
Apr. 13.....	619	548	538	751
Apr. 20.....	628	559	524	761
Apr. 27.....	645	586	543	782
May 4.....	666	573	536	767
May 11.....	681	555	542	774
May 18.....	679	616	546	779

Electric Power Output

(Million KWH)

Week ended	1940	1939	1938	1937
Feb. 17...	2,476	2,249	2,059	2,212
Feb. 24...	2,455	2,226	2,031	2,207
Mar. 2....	2,479	2,244	2,036	2,200
Mar. 9....	2,464	2,238	2,015	2,213
Mar. 16...	2,460	2,225	2,018	2,211
Mar. 23...	2,424	2,199	1,975	2,200
Mar. 30...	2,422	2,210	1,979	2,147
Apr. 6....	2,381	2,173	1,990	2,176
Apr. 13...	2,418	2,171	1,958	2,173
Apr. 20...	2,422	2,199	1,951	2,188
Apr. 27...	2,398	2,183	1,939	2,194
May 4....	2,386	2,164	1,939	2,176
May 11...	2,388	2,171	1,968	2,195
May 18...	2,422	2,170	1,968	2,199

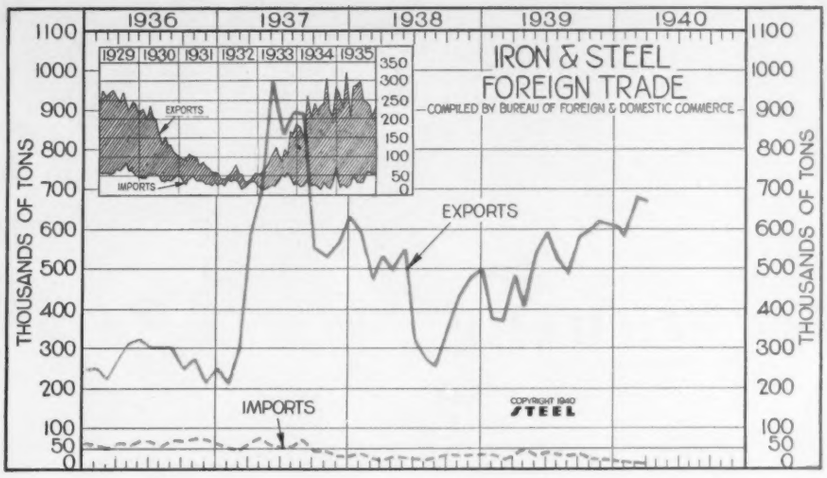




Auto Production

(1000 Units)

Week ended	1940	1939	1938	1937
Feb. 17....	95.1	79.9	59.1	95.7
Feb. 24....	102.6	75.7	57.0	111.9
Mar. 2....	100.9	78.7	54.4	127.0
Mar. 9....	103.6	84.1	57.4	101.7
Mar. 16....	105.7	86.7	57.5	99.0
Mar. 23....	103.4	89.4	56.8	101.0
Mar. 30....	103.4	86.0	57.5	97.0
Apr. 6....	101.7	87.0	70.0	99.2
Apr. 13....	101.9	88.0	62.0	125.5
Apr. 20....	103.7	90.3	60.6	133.2
Apr. 27....	101.4	86.6	50.7	139.5
May 4....	99.3	71.4	53.4	140.2
May 11....	98.4	72.4	47.4	140.4
May 18....	99.0	80.1	46.8	131.3



Iron and Steel Foreign Trade

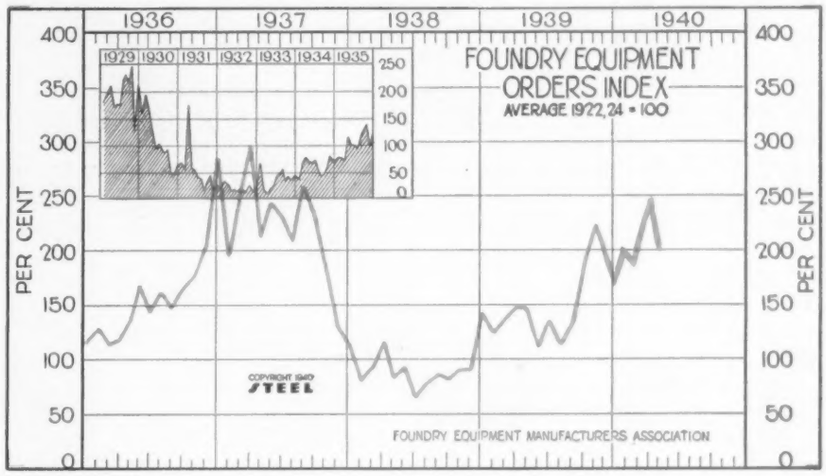
(Thousands of Tons)

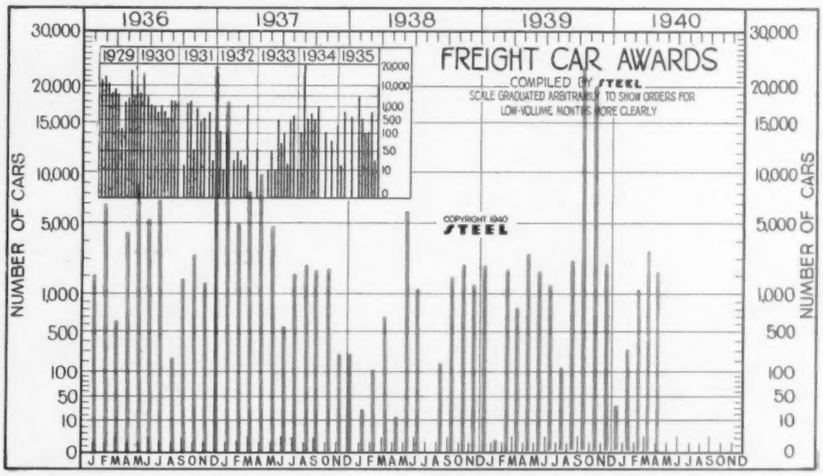
	Exports			Imports		
	1940	1939	1938	1940	1939	1938
Jan.	583.6	362.7	586.3	8.3	27.7	29.6
Feb.	671.3	359.7	460.6	6.7	19.1	19.6
Mar.	664.0	474.4	526.9	5.1	25.4	11.8
April	.....	394.0	489.2	...	44.1	21.2
May	.....	532.6	540.6	...	28.1	20.8
June	.....	588.9	312.0	...	32.6	15.9
July	.....	513.7	263.7	...	30.8	14.7
Aug.	.....	477.1	242.1	...	28.3	20.0
Sept.	.....	575.6	346.1	...	29.9	28.0
Oct.	.....	591.9	425.4	...	19.2	26.4
Nov.	.....	605.6	6.46.2	...	15.2	27.6
Dec.	.....	600.4	490.1	...	14.7	28.8
Tot'l.	.....	6076.4	5152.7	...	315.2	264.6

Foundry Equipment Orders Index

1922-24 = 100

	1940	1939	1938	1937	1936
Jan.	197.9	122.3	76.8	190.9	127.0
Feb.	179.4	135.3	90.4	249.5	110.4
Mar.	243.4	146.6	114.6	294.2	115.0
April	192.9	146.0	79.3	208.3	134.0
May	.....	108.8	90.6	242.0	165.4
June	.....	134.6	61.2	228.2	141.4
July	.....	111.9	74.2	204.0	159.5
Aug.	.....	131.4	83.3	257.5	144.8
Sept.	.....	184.4	78.7	231.8	161.0
Oct.	.....	220.4	87.9	185.2	173.8
Nov.	.....	203.1	89.7	128.0	200.4
Dec.	.....	164.8	141.8	111.2	283.3
Ave.	.....	150.8	89.4	210.9	159.7




1936
1937
1938
1939
1940
1929 1930 1931 1932 1933 1934 1935
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW-VOLUME MONTHS MORE CLEARLY
NUMBER OF CARS
COPYRIGHT 1940
STEEL
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

Freight Car Awards

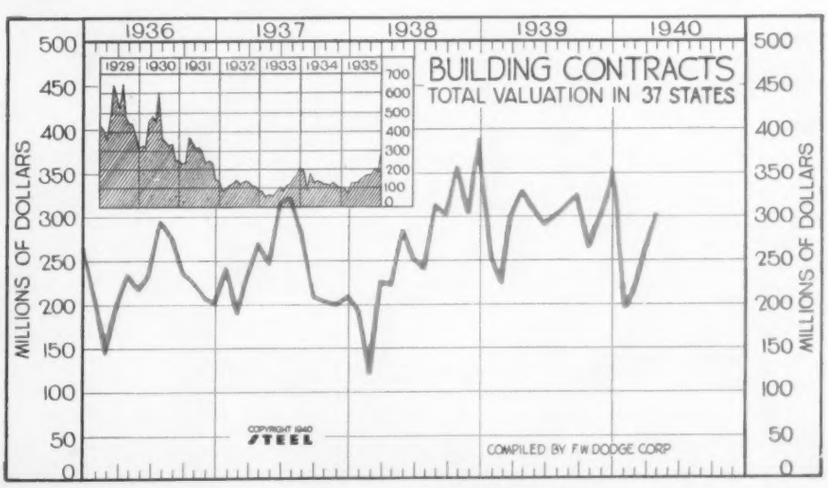
(Hundreds of Cars)

	1940	1939	1938	1937
Jan.	3.60	.03	.25	178.06
Feb.	11.47	22.59	1.09	49.72
Mar.	31.04	8.00	6.80	81.55
April	20.77	30.95	.15	97.72
May	.....	20.51	60.14	47.32
June	.....	13.24	11.78	5.48
July	.....	1.10	.00	10.30
Aug.	.....	28.14	1.82	14.75
Sept.	.....	230.00	17.50	12.16
Oct.	.....	196.34	25.37	13.55
Nov.	.....	26.50	12.32	2.75
Dec.	.....	.35	25.81	2.75
Total	.....	577.75	163.03	516.11

Construction Total Valuation In 37 States

(Unit: $1,000,000)

	1940	1939	1938	1937	1936
Jan.	$196.2	$251.7	$192.2	$242.7	$204.8
Feb.	200.6	220.2	118.9	188.3	142.1
Mar.	272.2	300.7	226.6	231.2	199.0
April	300.5	330.0	222.0	269.5	234.8
May	.....	308.5	283.2	243.7	216.1
June	.....	288.3	251.0	317.7	232.7
July	.....	299.9	239.8	321.6	294.7
Aug.	.....	312.3	313.1	281.2	275.3
Sept.	.....	323.2	300.9	207.1	234.3
Oct.	.....	261.8	357.7	202.1	225.8
Nov.	.....	299.8	301.7	198.4	208.2
Dec.	.....	354.1	389.4	209.5	199.7
Ave.	.....	$295.9	$266.4	$242.8	$222.3



Die Making In the Modern Manner

Seasonal peaks in the automotive industries mean tool and die requirements cannot be met effectively by plant tool departments, so independent tool shops have grown rapidly

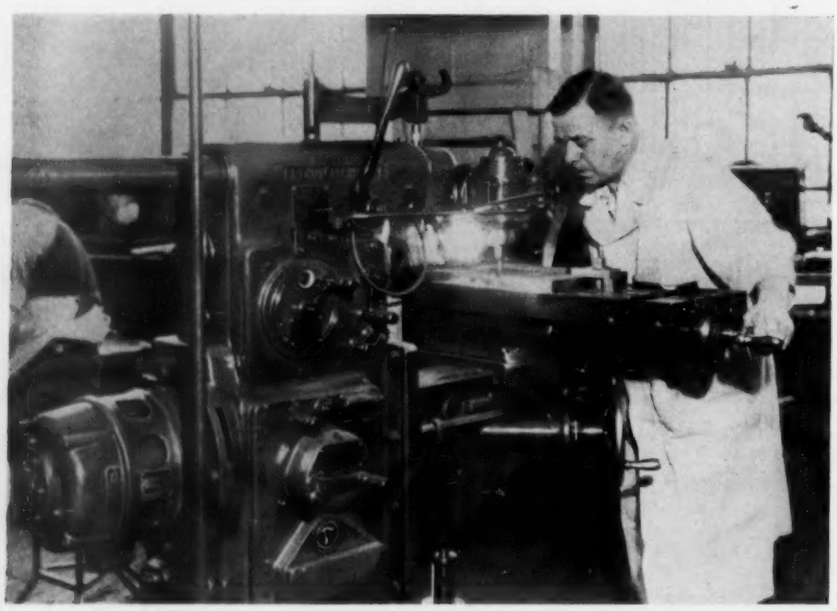
By FRED B. JACOBS

■ WHILE some of the basic tool designing principles remain practically the same as they were fifty years ago, methods followed in actual construction of jigs, fixtures, gages, punches and dies of all kinds have been changed greatly in recent years. In the old days, every manufacturer in the metalworking industry maintained his own tool room, equipped with what were considered accurate machine tools. These were manned by skilled "all-around" workmen. Seasonal rushes as we know them today were practically nonexistent. Toolmaking was carried on in a leisurely manner and the work was spread out to keep the toolmakers busy throughout the entire year.

The great change came about with the development of the modern automobile produced through intensive production methods in "yearly models." This resulted in a three-months-yearly rush to get the jigs, fixtures and other tools out in time to put the new models into production, followed by nine months of comparative inactivity in the tool room. This state of affairs resulted in the rise of independent tool and die shops specializing in the manufacture of special tools for the production metalworking industries. Many of these independent tool shops are well organized and well equipped, and so are in a position to turn out special tools of all kinds cheaper than it is possible to produce them in the conventional toolroom.

Representative methods followed in the production of such special tools in these independent tool shops are reflected in the practice of the J. C. Ulmer Co., 1791 East Thirty-eighth street, Cleveland, the history of which dates back to 1893. Originally this company began as a maker of surveying, engineering and other accurate instruments of precision. A department still is devoted to that work. Its major efforts, however, are devoted to designing and building special machinery and special tools of all kinds. The plant is equipped with about 75 high-grade machine tools, the facilities enabling at least 75 men to work on one shift. The designing staff ordinarily is 10 men.

Conditions under which work is accepted vary. In some instances clients desiring special tools present



The vertical milling attachment is used for a diversity of intricate milling operations where it is advantageous to have the work directly before the toolmaker's eyes at all times. The operation shown consists of milling an intricate die casting

only general ideas, on the basis of which the company designs the tools practically "from the bottom up." In other cases companies submit their own complete blueprints. Sometimes work is done on an hourly basis, and then again it is done on contract.

It is obvious that the basic tool making force must be composed of skilled, experienced men. Therefore the company has a number of key men constantly on its payroll. These can be depended upon to get satisfactory results under all conditions. A number of junior mechanics also are employed. These men are selected from the ranks of the most promising of high and trade-school graduates. Many of these young men develop remarkable skill in a relatively short time.

Bonus System Followed

The work is specialized to a great extent. For example, there are some men who devote their time to lathe, planer and shaper, and milling machine work, while others devote considerable time to bench work. This reflects the modern trend in machine shop practice. It hardly could be expected that an all-around toolmaker could be as skilled in boring accurate jigs as a man who devotes all his time to this work. By the same token, a man who devotes all his time to making punches and dies naturally will turn out better work faster than one who has not specialized on this kind of thing. Efficiency brought about through specialization is likewise reflected in the making of various kinds of gages, gage making having become a trade in itself.

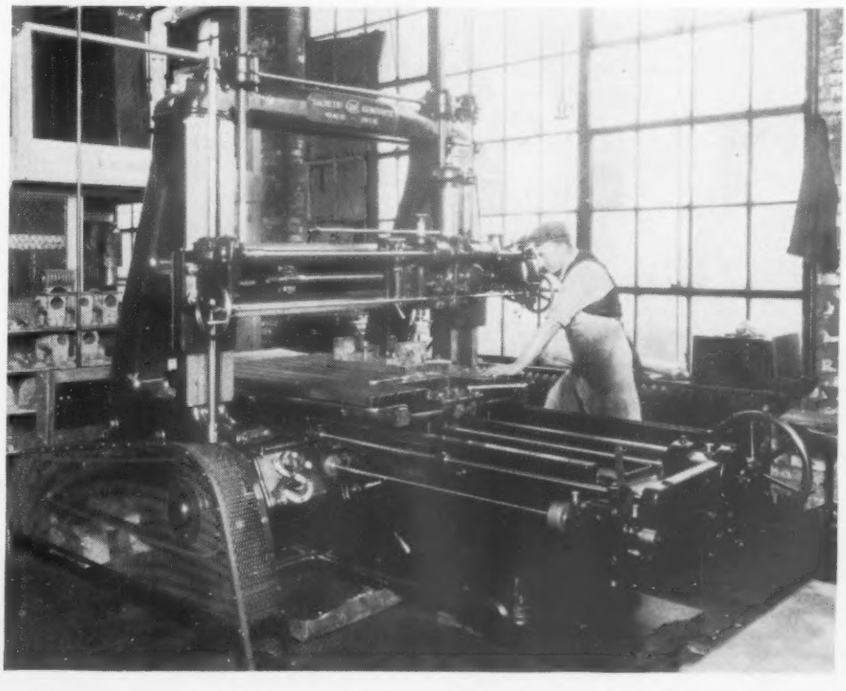
It is possible to keep the entire regular shop force busy month in and month out because the company serves many industries that are not seasonal. To offer an inducement for the men to keep production up to a given standard, a bonus system is followed. The production engineers figure the reasonable time required to carry out each job, their conclusions being based on long experience. Thus the man who gets a certain job knows how many hours the management expects him to devote to the work. If the job is done in less than the allotted time, the workman gets a bonus.

The building of special machinery also is an important part of the company's business. This often involves considerable experimental and development work, especially when an individual or a firm comes to them with only an idea for a new labor-saving machine of some kind. Then again, when the client does have complete drawings of the unit, it is necessary in many cases to make many changes in the initial machine before it meets its designer's expectations. Through long experience and with a staff of skilled men, it is possible for an organization such as this company to carry out this kind of work more economically than the average manufacturing company can do it in its own shop. While development work always has been necessary throughout the entire metalworking industry, it is only of late years that it has become recognized as an important branch of tool and die-shop work.

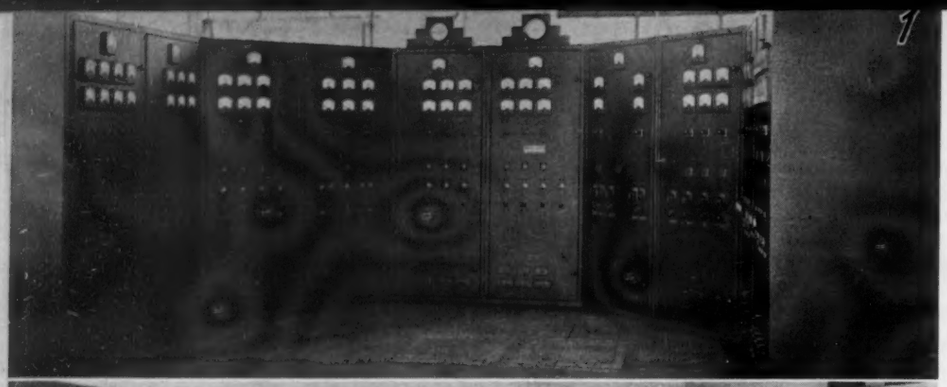
When an individual or a firm developing a new machine does not want any outsider to become acquainted with its essential working principles, the experimental model often is constructed piecemeal, the work being divided up among a number of tool and die shops. Because of the accuracy of parts made in such shops, its assembly and testing can be done satisfactorily in the secrecy of the machine owner's plant.

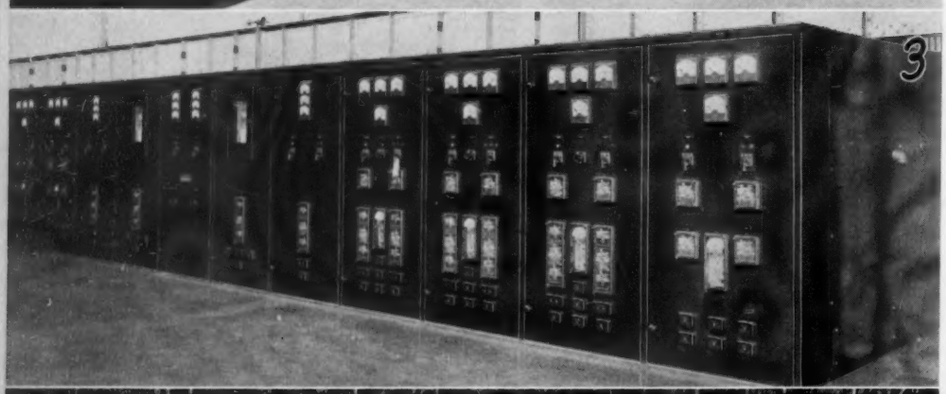
Sometimes it is advantageous to make a small working model of a new machine or appliance because it will be cheaper to make a model than a full sized machine. Tool and die shops today do a considerable amount of this kind of work as well as the making of working models of machines to be used for display purposes.

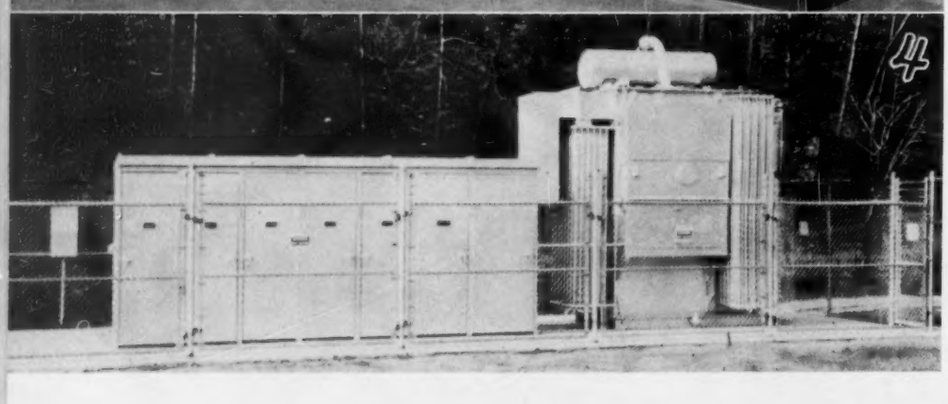
Partial view of gage-making department. This is accurate work of the highest order so men must have much experience. Surface plates scraped to true planes must be used when taking measurements and laying out work



This Swiss jig borer is used for majority of jig boring work. Each spacing screw is fitted with an accurate compensating device to assure maximum accuracy. Limits less than 0.0005-inch can be maintained when necessary







Steel

By L. F. DYTRT
General Electric Co.
Philadelphia Works

■ INCREASED use of steel in switchgear is due primarily to its extremely high resistance to arc burning. Tests have demonstrated that steel employed in framework, partitions and enclosing sheets offers greater resistance to destruction by arcs than most common metals and many of their alloys. Steel also is superior to insulating materials in this respect. In addition, dead-front steel-enclosed switchgear assures maximum safety to operators and is fireproof. Self-supporting steel switchgear can be shipped completely fabricated, requires minimum installation expense, can be moved about as occasion demands without modifying building structures.

From manufacturer's standpoint, steel is desirable because it is readily obtainable, is exceedingly uniform and has high structural strength. Possibly more important is its easy fabrication.

For these reasons, steel is used almost exclusively for frameworks, enclosing and partitioning plates, reinforcing members, gussets and device mountings. Although not adopted exclusively for panels, it is widely used there. Further, it is generally employed for accessories and device parts such as instrument cases, circuit-breaker tanks, operating mechanisms, etc.

Three grades of steel are used. All are free of rust, scale and other blemishes and, in sheet or plate form, are ready for immediate fabrication with no additional processing. Structural forms, however, are first given a sandblast to assure good paint bond. Steel for panels, doors, enclosures, benchboards, etc., is

Switchgear

usually soft open-hearth sheet with 0.10 to 0.15 per cent carbon. Yield point varies from 22,000 to 25,000 pounds per square inch, tensile strength between 45,000 and 50,000 pounds per square inch and elongation about 25 per cent in 8 inches.

Framework and reinforcing members employ channels, angles, I-beams and structural sections made from a medium open-hearth steel with 0.25 per cent carbon; yield point, 30,000 to 36,000 pounds per square inch; tensile strength, 60,000 to 72,000 pounds per square inch; elongation, 22 per cent in 8 inches.

Open-Hearth Steel Employed

For device mountings, gussets, strengthening plates, oil circuit-breaker tanks, etc., soft open-hearth sheet or plate is employed with carbon content from 0.15 to 0.22 per cent, yield point around 25,000 pounds per square inch, tensile strength about 50,000 pounds per square inch, 22 per cent elongation in 8 inches.

First step in fabrication of sheets, angles and channels is to shear or cut to required length. Next, framework steel undergoes necessary punching, drilling, tapping and matching operations. Sheet material for the most part follows a similar course, although here punching work may be rather elaborate. In fact, so much punching is necessary that much of this work is done in large turret-type presses such as the unit in Fig. 5.

This machine punches a wide variety of sizes and shapes of holes, has an extremely deep jaw, is equipped with a work-table having rollers on face to permit easy movement of material. In addition, guides and indicators are provided for accurately locating holes punched, thus eliminating layout work.

After being punched, sheets are ready for bending, preceded in a few cases by drilling. Bending brakes of several types are used to form corner flanges which reinforce the sheets and form mounting surfaces. In bending notched angles and similar structural pieces, a special hydraulic press is used. Formed to the desired shape, angles, channels and sheet are ready to be joined together.

Most assembly work is done by electric welding using both resistance and arc methods. Most resistance welding uses heavy-duty portable welding guns or heads shown in Fig. 6. These guns are trigger operated and employ air pressure to produce the desired force between the welding electrodes. An automatic timer that accurately controls time current is applied. Note in Fig. 6 the counterbalancing arrangement for the two heads at the right, each gun being supported on an overhead swivel arm which gives extreme flexibility in moving the head about to reach the various points on the frame structure. As much assembly of structural elements as possible is done on the welding floor. Occasionally a structure will be assembled completely. More often, however, the material ends in the form of frameworks or partially covered frameworks which are passed on to subsequent operations.

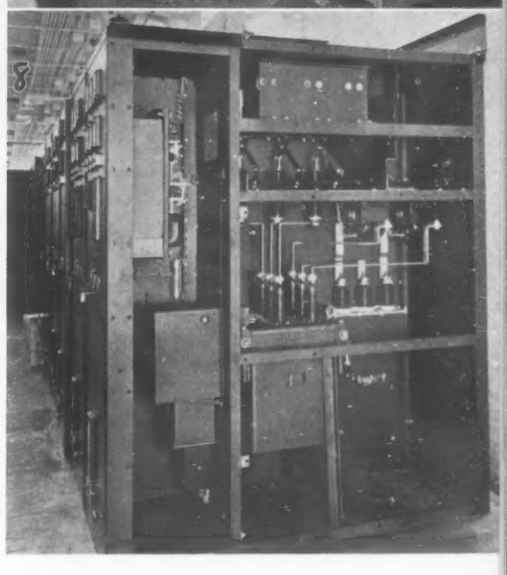
Rough spots acquired in welding are buffed off to make clean smooth surfaces for painting. Fig. 7 shows switchgear being sprayed in the paint shop. The partially completed units are painted progressively. The chain conveyor passes through a number of spray booths in which three coats are applied and baked successively.

Enclosures Attached

Final assembly involves the setting up and wiring electrical parts, attaching plates and other elements that serve either to enclose or to form part of the switchgear equipment. Fig. 8 is an oblique end view of a typical switchgear cubicle of the all-steel-enclosed dead-front type as used for alternating-current motors and feeders. Although substantially the same manufacturing procedure is followed in all cases, switchgear differ widely according to type of application as each type has certain special characteristics.

For instance, the vertical panel type shown in Fig. 8 consists merely of a punched and flanged steel sheet on which are mounted the various meters and electrical devices. Sometimes, as in Fig. 8, circuit breakers and other equipment are included in cubicles behind the face of the board. Wide flanges on panels provide sufficient strength to withstand bending stresses of the weights of material and operation loadings involved so further strengthening or stiffening measures seldom are necessary. Steel's inherent strength and workability render unnecessary the use of brackets, bolts and other appearance-detracting items. Except for the essential devices appearing on them, steel panel faces are bare, giving an effect of streamlined unity.

7


8

Practically all wiring between devices and terminal box is carried in vertical steel ducts or conduits of rectangular cross section.

Duplex switchboards such as in Fig. 1 are self-supporting, completely enclosed and make efficient use of small space. Main steel sections of such equipment perform the dual function of panels and doors leading to structure interior, thus called "duplex."

Frequently combined with simple panel and duplex types of switchboards are control desks or bench boards, Fig 2. Like other units, bench boards are constructed of angle frames with sheet steel enclosing surfaces. Top front surfaces contain most of the electrical devices. The sloping bench surface contains the operating controls. Sheet-steel skirts completely enclose fronts and ends.

Oil-blast and air-blast circuit breakers having 500,000 kilovolt-ampere interrupting capacity are

(*Please turn to Page* 68)

Steel Powder for Iron . . .

Restriction of Swedish sponge supply spurs American search for substitute material, with gratifying success. Granulated pig iron is decarburized to produce steel powder. May be commercial soon

■ FIRST public announcement of the prospective availability of a new type of iron powder, exceeding in physical properties and equaling in purity the Swedish sponge iron powders, was made by Gregory J. Comstock, associate professor of metallurgy, Stevens Institute of Technology, Hoboken, N. J., and engineering consultant, speaking before the Saginaw Valley group, American Society for Metals, May 21, in Saginaw, Mich.

Mr. Comstock announced results of tests on the new powder, tentatively known as NY 100, and said that rights to the manufacturing process had been acquired by N. K. G. Tholand, president of Ekstrand & Tholand, New York, importers of Swedish iron and steel specialties.

With American supplies of the former Eto (contraction of Ekstrand & Tholand) powder restricted because of European hostilities, it became apparent to the importers that some arrangements would have to be made to fill domestic demands for the high-purity powder. Recent experiments abroad indicated that iron powder, or in fact steel powder, could be produced as a by-product of the Kalling-Rennerfelt process for converting granular pig iron into a low-carbon melt material. Hence steps have been taken to initiate this process in this country, assuring supply of an even higher grade powder for compressed and sintered parts, according to Mr. Tholand.

How Powder Is Made

The Kalling-Rennerfelt process was described before the annual meeting of the British Iron and Steel institute last fall in a paper which was subsequently published in Vol. II of the *Journal* of the Iron & Steel institute for 1939. Inventors are Count Bo Kalling and Ivar Rennerfelt of Stockholm. Essentially the process comprises tapping molten iron from the blast furnace, granulating it by spraying into a water bath, feeding it continuously into a rotary furnace where it is decarburized without melting in a gas mixture of carbon dioxide and carbon monoxide, proportioned so that decarburization occurs without simultaneous oxidation of the iron or other metallic constituents.

Discovered by Research

At the time the process first was described it was not revealed that it had possibilities as a source of iron powder, but research sponsored by Mr. Tholand has confirmed this fact, although the situation abroad made necessary announcement of the process somewhat ahead of the sponsor's plans.

The rotary furnace used and the end effect accomplished suggest that the method is somewhat similar to the bessemer process, with the exception that the product is not molten. Unit built at the Fagersta Bruks Aktiebolag in Sweden was designed for 6 to 10 tons per day output. It is 14 feet in length, 4½ feet in diameter. Diagrammatic sketch of the installation, together with certain details of operation in the production of melting stock, appeared in *The Iron Age* for Nov. 2, 1939, p. 40.

NY 100, the powder which Ekstrand & Tholand say will be available commercially in a short time, comes in three grades, A, B and C, varying principally in carbon content, A being practically carbon-free and C containing carbon in approximately the amount of eutectoid steel. The most interesting feature of the new powders is that actually they are steel powders and not iron powders, containing "normal" amounts of manganese and silicon in addition to carbon. Eventually it may be possible to include other alloying elements in the analysis.

Mr. Tholand said the price of the powder would be comparable to that of the former Swedish sponge iron, if not somewhat lower; the latter has been bringing 8-9 cents a pound, with a guaranteed maximum gangue content of 0.5 per cent silica. Commenting on the subject of iron powder prices in general, Mr. Tholand said there were three types of powder—carbonyl iron powder which brings around $1 per pound; electrolytic or hydrogen reduced powder which costs 35-60 cents a pound; and the sponge iron powder already referred to. Low cost of the latter has been possible chiefly because it is the by-product of production of melting sponge and yearly output of this material has ranged from 20,000-25,000 tons in Sweden. Yearly consumption of high-purity iron powder in this country at the present time probably does not average much over 1000-2000 tons, if that.

Superior Physical Properties

Density tests reported by Mr. Comstock on the NY 100 material showed that under compression of 50 tons per square inch on 100-mesh powder, followed by sintering for 30 minutes at 2100 degrees Fahr., a figure as high as 89.46 per cent of solid density could be achieved, considerably above the best possible with the Eto powders. Tensile strengths following a single pressing and heat treatment as high as 58,000 pounds per square inch were realized. Tests on the Eto powder compacts, under same pressures and sintering conditions showed ultimate strength of around 21,000

pounds per square inch with 8 per cent elongation, further increased to 38,000 pounds tensile and 0.5 per cent elongation after cold coining and resintering, and still further raised to 64,000 pounds tensile after pack carburizing at 1700 degrees Fahr. for 12 hours.

In reviewing the subject of iron powder metallurgy, Mr. Comstock pointed to the crying need for more fundamental research on phenomena encountered in pressing and sintering. No clear explanation has been offered for why powdered iron compacts shrink after sintering, yet photomicrographs reveal a definite agglomeration of the iron particles after heat treatment. Recrystallization effect or the result of latent surface energy on each particle have been suggested as explanations, but no definite proofs are available. In the making of compressed and sintered parts, allowance of about 1 per cent must be made for shrinkage.

Mr. Comstock said much remains to be done with regard to the alloying of iron powders to obtain special properties. Also he forecast that some new compressing technique is called for to avoid the inordinately high pressures required, particularly in the molding of larger pieces. Limitations in press design and the high cost of such equipment are obstacles. Another "bugaboo" in this work is the danger of entrapped air in the compact, giving rise to blisters on the surface or even explosion of the part itself.

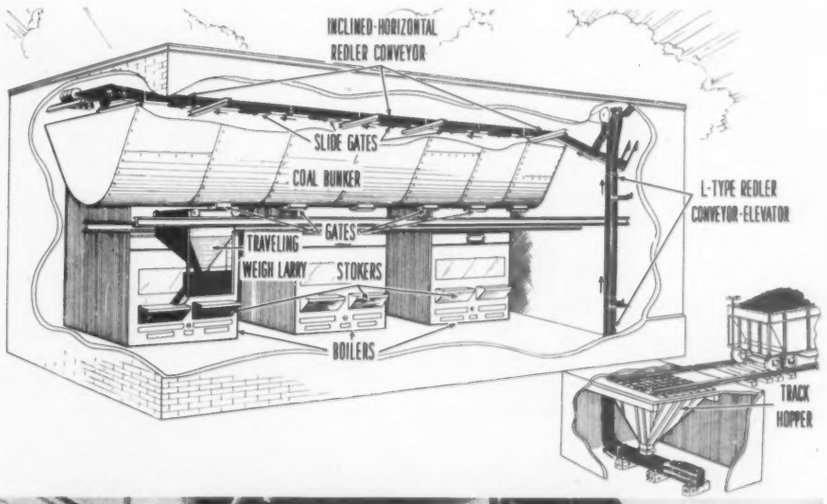
Careful regulation or modulation of particle size to obtain special effects in compacted powder parts was cited by Mr. Comstock as the "ultimate refinement" in iron powder metallurgy.

Dust-Tight Conveyors Help Keep Boiler Room Spotless

■ AT THE Hopkins, Minn., plant of Minneapolis Moline Power Implement Co., an installation of dust-tight conveyors handles coal from the track hopper to storage bunker over the boiler room from which point it is delivered to the stokers in the three boilers by means of a traveling weigh larry. Diagrammed in Fig. 1, coal is discharged from freight cars through a large-mesh grating into a hopper directly below the track, subsequently entering a Redler conveyor which takes it vertically to the horizontal inclined distributing conveyor feeding the overhead coal bunkers through slide gates at six points.

This system handles coal up to 1½ inches at a rate of 32 tons per hour with conveyors traveling at the speed of 62 feet per minute. The ability of the Redler type conveyor to handle material in any direction permits the entire coal handling job in this power plant to be accomplished with only two conveyors. The first conveys the coal horizontally from under the track hopper and around a bend corner to elevate it to the upper level. Here, the lower end of a horizontal inclined conveyor takes coal on a slight incline up to the top of the coal bunker and distributes it throughout the length of the bunker in any required quantities. The first conveyor has a horizontal run of 23 feet 3 inches and a vertical lift of 59 feet 7 inches. The inclined horizontal conveyor is 75 feet 4 inches long.

On this installation, no feeders are necessary below the track hopper or at the start of the horizontal run across the bunker. The coal merely choke-feeds into the units which automatically take only as much coal as can be handled in their casing which is 9 inches square in cross section. The conveyors are totally enclosed and so handle the coal without any dust entering the atmosphere. Fig. 2 is evidence that the system actually is dust-tight as the spotlessly clean surfaces of boilers and equipment in the boiler room testify.



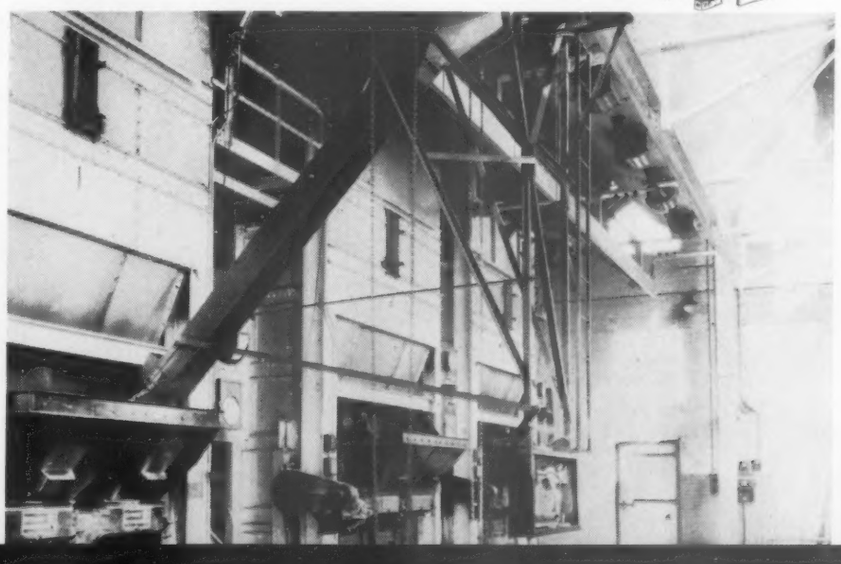


Fig. 1. (Upper)—Diagram shows how two conveyors handle entire movement of coal in this power plant

Fig. 2. (Lower)—Bright clean surfaces attest to effectiveness of this method of keeping a boiler room in top condition

Adherent Lubricating Coating Announced

■ A stable and adherent lubricating coating for use in prelubricating surfaces is announced by Acheson Colloids Corp., Port Huron, Mich. It is applied in liquid form, either by dipping, brushing or spraying and hardens on exposure to light.

Basic element providing the lubrication is colloidal graphite. The coatings may be applied at normal temperatures or to surfaces heated up to 100 degrees Cent. for rapid drying.

Automatic Bender Produces Rifle Part at Rate of 2000 Per Day

■ NOW OPERATING in a United States armory where it is being utilized to produce a part for one of the newer military rifles is an automatic bending machine introduced by Thomas-Gibb Electric Welding Co., Lynn, Mass. Function of machine is to bend a small part previously shaped or stamped out. It is daily meeting successfully its contract requirement by producing some 2000 pieces per 8-hour day.

Parts are bent by applying pressure to air operated sliding dies which clamp the work and which can be adjusted to produce any required angle. As soon as the bending is complete, heat is applied automatically to relieve the stresses which would otherwise cause the part to spring back out of shape.

Clamps Serve as Electrodes

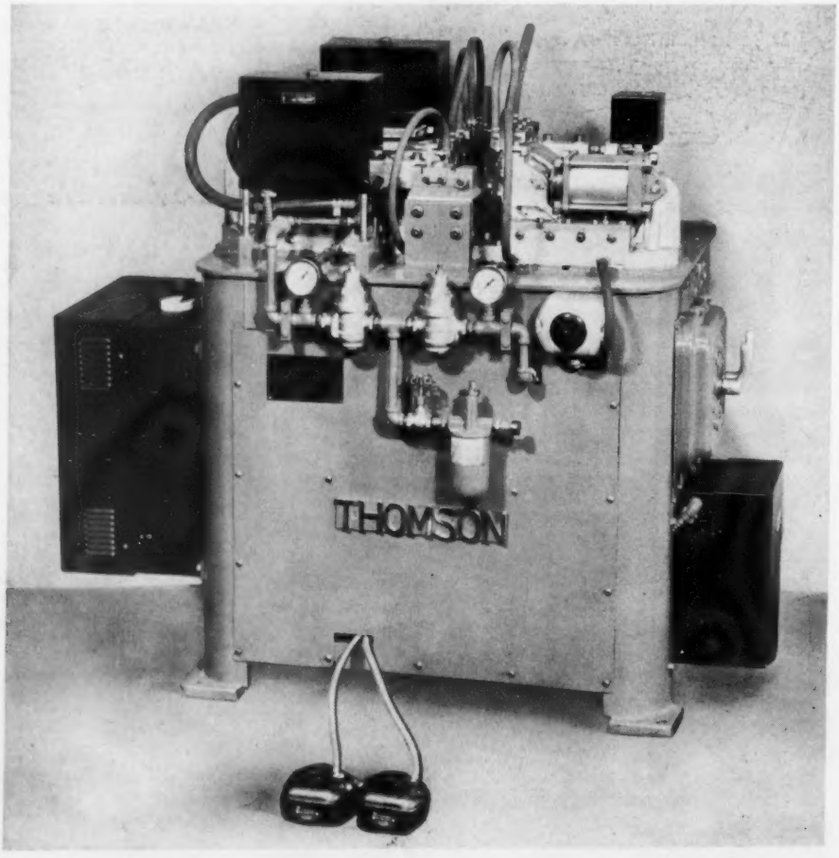
The machine is powered with a 30 kilovolt-ampere transformer and is equipped with four sets of clamps which also serve as electrodes.

In operation, the work is first clamped in the stationary electrodes which grip it in the center so it can be offset at either end. Then the end electrodes clamp and slide to bend the work while still cold. Pressure switches in the air cylinders turn on the heat automatically. An adjustable timer governs the duration of the current flow and a time delay unit permits work to cool after current is cut off and before clamps release the work.

Clamps are connected in series to provide uniform heat on either end, and the current flows from the outside clamps to the inside and is shunted around the middle section of the work so that it is not heated.

Although the rifle part is tubular in section, work of any uniform section could be handled in the same manner provided it was equipped with dies of proper shape. In this case, dies are arranged for easy adjustment so operator can keep the offsets within close limits permitted, but if necessary the same feature could be used to adapt the machine for making a variety of bends in the work of about the same size.

High production and extreme accuracy in the finished product are features of the illustrated bending machine. All operations are controlled automatically with minimum of handling



Thermoplastic Resin Prevents Corrosion

■ A new dark, thermoplastic resin, Polyxile, made from chemical derivatives of wood and other cellulosic materials has been developed by Polyxor Chemical Co., New Haven, Conn. It can be used as an anticorrosive on metals, a paper waterproofing agent and as a protective coating on concrete and stone against the influence of the sun and rain.

The resin is manufactured in several grades of different hardness. It is dissolved by many of the usual organic solvents such as ketones, pinene and chlorinated hydrocarbons.

Solutions can be applied by spraying, brushing or dipping and further processed by heat treatments, especially when using on steel surfaces. Coatings are stable at temperatures over 150 degrees Cent. They are not attacked by caustic and organic acids, with the exception of highly concentrated sulphuric or acetic acids at elevated temperatures. Special grades are stable against nitric acids.

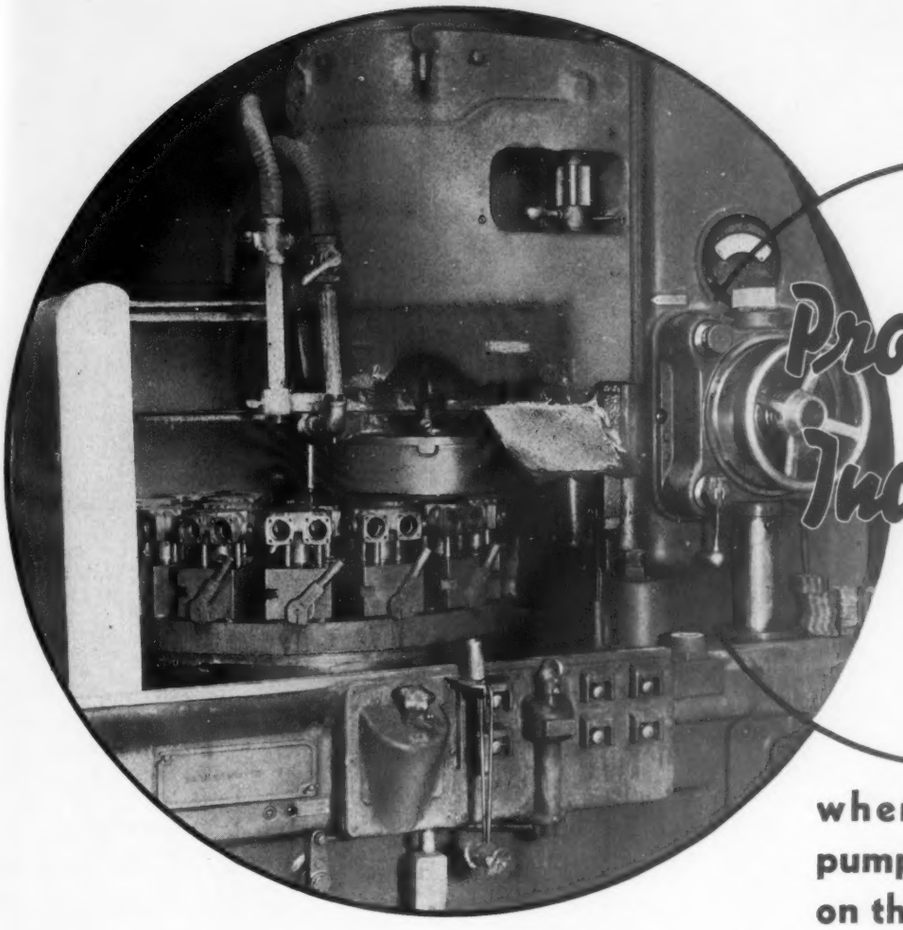
Develops Pellets for Governing Temperatures

■ Thermometric pellets developed by Tempil Corp., 132 West Twenty-second street, New York, may now be used in controlling temperatures in industry. These have a sharp, rapid melting action and are said to be accurate within 3 per cent of the temperature stamped upon them. In using them the user simply selects the pellet marked with the temperature corresponding to that he wishes to obtain and places it on or against the heated object.

The pellets, known as Tempils, are not corrosive to metal and do not pit or leave stains which cannot be removed. They come packed in unbreakable, transparent tubes and are available in whole hundred degree ranges from 200 to 1500 degrees Fahr.

Introduces Nonslip Steel Running Boards

■ Made from solid steel plate, the new A. W. slotted type super-diamond steel running board developed by Alan Wood Steel Co., Conshohoken, Pa., provides faster drainage and insures protection against falling accidents. The slots are hand-hold size for extra security and their arrangement minimizes the possibility of slipping. While developed especially for railroad use, the running boards incorporate features suitable for a variety of applications.



Production Increased 71%

when this oil burner pump body was ground on the Blanchard No. 18.

THE BLANCHARD NO. 18 is a versatile machine — versatile because of the variety of parts it will handle — versatile in that it may be used for both roughing and finishing cuts. The 6-inch diameter cast iron pump body, shown above, is ground to limits of +.0003″ and −.0001″. In this operation .012″ of stock is ground off one side of each piece.

Blanchard cylinder grinding wheels, manufactured by the Blanchard Machine Company, are used on this job. This was another reason for being able to increase the production from 28 to 48 pieces per hour.

Group of parts ground on the Blanchard No. 18 shown at the left.

A second Blanchard No. 18 Surface Grinder was recently sold to this same shop on the basis of the performance of the first machine.

A complete study of your own grinding requirements will be made without obligation — just send us samples of your work with grinding instructions.

THE BLANCHARD MACHINE COMPANY
64 STATE ST., CAMBRIDGE, MASS., U.S.A.

SEND FOR YOUR FREE COPY OF THE BLANCHARD WORK BOOK

Tailored Firebrick

System of refractory shapes is developed to permit formation of circumferential dimensions with exactitude. Face to face bearing reduces uneven stresses and pinching of brick under expansion

By **WALLACE A. STUART**
Refractory Sales Division
Babcock & Wilcox Co.
Cleveland

■ FIREBRICK have been manufactured for nearly half a century according to standard sizes which were originally more or less arbitrarily established. Two standard series of shapes are common, the 2½-inch and the 3-inch series. The former is perhaps most generally used and all of the standard shapes in it are derived by variations of the "straight" which is 9 x 4½ x 2½ inches. In the 3-inch series, the basic "straight" is 9 x 4½ x 3 inches. These series are shown in any manufacturer's catalog of standard shapes.

These standardizations of shapes and dimensions represent more or less a "rule of thumb," or practical compromise between manufacturing requirements and the necessity of laying up firebrick shapes into curved or circular structures such as arches, domes, etc.

Common practice is to effect circularity in a structure by combining "straights" with wedges, or keys, or arch shapes, depending upon the thickness desired. Obviously, by reason of the difference in the dimensions of the ends of a wedge-shape firebrick, for example, the shapes will form a circle if laid in face-to-face contact with each other and with their small ends facing in the same direction. The introduction of one or more straights (having parellel faces) increases the diameter of the circle which the wedges describe. Thus circles of almost any diameter are approximated.

In estimating the number of straights and wedges or arch shapes, etc. required for any given construction, tables are in general use, such as Table I.

TABLE I—9 x 4½ x 2½-Inch Wedge Brick

Inside diameter	Number required to turn circle: No. 2 Wedge	No. 1 Wedge	Straight	Total
2′-3″	57	..	..	57
2′-6″	51	10	..	61
3′-0″	38	30	..	68
3′-6″	25	51	..	76
4′-0″	13	71	..	84
4′-6″*	..	91	..	91
5′-0″	..	91	7	98
5′-6″	..	91	15	106
6′-0″	..	91	22	113
6′-6″	..	91	30	121
7′-0″	..	91	38	129
7′-6″	..	91	45	136
8′-0″	..	91	53	144
8′-6″	..	91	60	151
9′-0″	..	91	68	159
9′-6″	..	91	75	166
10′-0″	..	91	83	174

*See Fig. 1.

In this table it is shown that fifty-

Fig. 1—Refractory tables call for 91 No. 1 wedge brick to form a 4½-foot diameter circle

91 x 2.5″ =227.5″ brick for 226.19″ circum.
91 x 1.875″=170.63″ brick for 169.65″ circum.

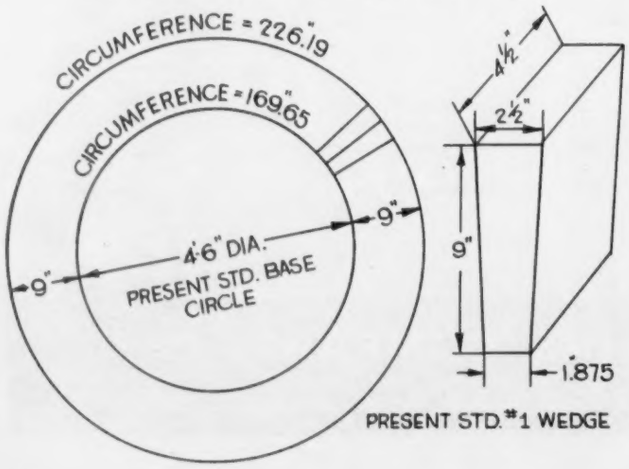
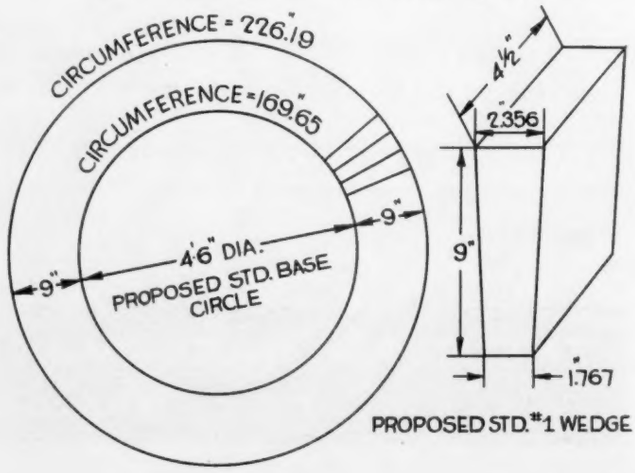


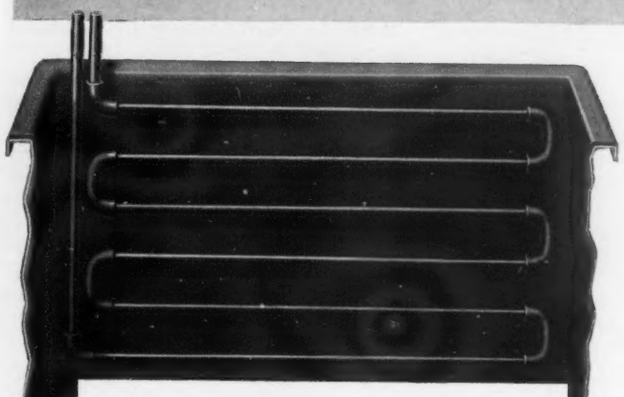
Fig. 2—Proposed system calls for 96 No. 1 wedge brick to form a 4½-foot diameter circle

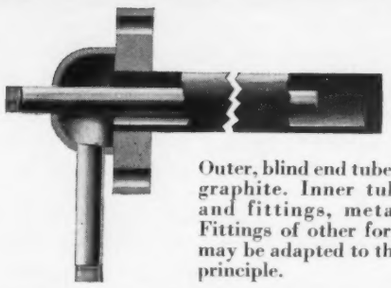
96 x 2.356″=226.17″ brick for 226.19″ circum.
96 x 1.767″=169.63″ brick for 169.65″ circum.



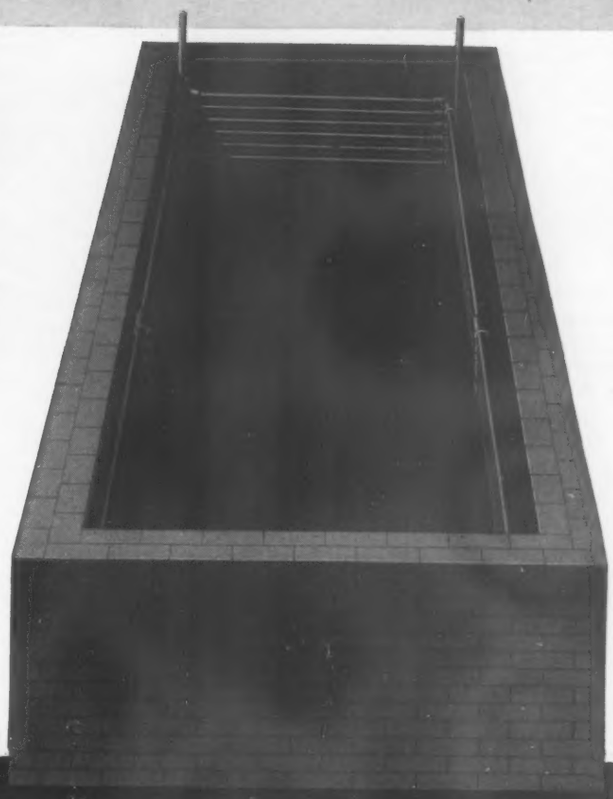
AVOID DILUTION OF CORROSIVE BATHS

AND SOLUTIONS HEATED BY INJECTION OF LOW PRESSURE STEAM





Outer, blind end tube is graphite. Inner tube and fittings, metal. Fittings of other form may be adapted to this principle.



- Graphite pipe and fittings have high heat conductivity, low coefficient of thermal expansion and good mechanical strength.
- They are sufficiently impervious to carry low pressure steam without disturbing seepage.
- They are immune to reaction with most of the materials encountered in chemical manufacturing industries at the concentrations and temperatures ordinarily employed.

USE NATIONAL GRAPHITE PIPE AND FITTINGS

TRADE-MARK

If a less pervious material than graphite is required, "Karbate" No. 2, a graphite base, corrosion resistant product, can be used on most applications.

"Karbate" Valves are also available in 1 inch to 4 inch sizes.

"NATIONAL" Carbon and Graphite Brick, Tile and Special Structural Shapes are used for lining vats and tanks and for other types of construction where resistance to corrosion is an essential property.

THE WORDS "NATIONAL" AND "KARBATE" ARE TRADE-MARKS OF NATIONAL CARBON COMPANY, INC.

NATIONAL CARBON COMPANY, INC.

UCC

Unit of Union Carbide and Carbon Corporation

Carbon Sales Division: Cleveland, Ohio

GENERAL OFFICES
30 East 42nd Street, New York, N. Y.

BRANCH SALES OFFICES
New York, Pittsburgh, Chicago, St. Louis, San Francisco

seven No. 2 wedges (9 x 4½ x 2½ x 1½ inches) describe a circle of 2 feet 3 inches inside diameter. This is proved as follows:

$$\text{Circumference} = \pi \times \text{diameter}$$
where $\pi = 3.1416$
then $2'\text{-}3'' \times 3.1416 = 84.8''$ circumference

To find the number of No. 2 wedges, divide by the smaller (inside end dimension), 1½ inches:

$$\frac{84.8}{1.5} = 56.5$$

As it is customary (because many first quality firebrick are undersized or oversized) to count fractional parts of one-tenth of a brick or more as an entire brick, and to disregard smaller fractions, 56.5 is counted as 57 No. 2 wedges required, as indicated in the table.

Similar calculations show that, for a circle 4½ feet inside diameter (169.6 inches inner circumference), 90.4 No. 1 wedges are required which is shown in the table as 91 such shapes, (9 x 4½ x 2½ to 1⅞ inches).

In other words,

$57 \times 1\frac{1}{2}'' = 85.5''$, or 0.7" more than $\pi \times 2'\text{-}3''$

$91 \times 1\frac{7}{8}'' = 170.6''$, or 1.0" more than $\pi \times 4'\text{-}6''$

For a further increase of inside diameter, it is customary to assume the basic circle "turned" by 91 No. 1 wedges (4 feet 6 inches) and allow for further increase by the insertion of 9 x 4½ x 2½-inch straights. For a circle of 5 feet inside diameter:

	Circumference, inches
5' × 3.1416	= 188.5
91 × 1.875 (for No. 1 wedges)	= 170.6
To be made up by straights	17.9

17.9 ÷ 2.5 inches (thickness of straights) = 7.16 straights needed, although in practice assumed to be 7.

The present tables employed for bricks are based on the formula that there is a base diameter around which the present radial brick are supposed to fit (see Fig. 1) and for any increase in diameter the opening created is now filled with straight bricks whose thickness is 2½ inches, and these straights will not fit the true circumferential increase.

The foregoing paragraph is more clearly explained with a circle made up of only 9-inch radial brick by the following example:

Inner base diameter × π = Inner circumference
Outer base diameter × π = Outer circumference

To accommodate a circle whose diameter has increased 1½ inches over the base circle we find the following circumferential increase:

	Increase, inches
Inner base diam. + 1½" × π = (Inner circum.)	4.71
Outer base diam. + 1½" × π = (Outer circum.)	4.71

From the foregoing it is readily seen that two straight brick of the present standard 2½ inches dimension will give a total of 5 inches to fill an opening of only 4.71 inches while two of the straight bricks of the author's standard dimension of ¾ pi or 2.35 inches will give a total of 4.70 inches and will positively fit in the opening created. See Fig. 2.

Brick shapes, which accomplish the forming of circular sections of all sizes exactly, have been developed and patented. The proposed shapes are dimensioned with regard to the mathematical law:

Circumference = 3.1416 diameter

The proposed method for forming arches and other circular sections calls for the use of tapered-shaped bricks whose sides are radial to a circle of base diameter. For every ¾-inch increase over the base diameter, one straight brick whose thickness is ¾ × 3.1416 = 2.35 inches is added. This thickness for straights has been adopted because it nearly conforms to the present 2.50 inches thickness of standard straight brick as now used. This, of course, applies to arches, etc. which are 9 inches thick. For thinner thicknesses at present arbitrarily-dimensioned arch brick are used for thickness of 4½ inches. Under the proposed system tapered shapes whose sides are radial to a circle of basic diameter would be used and one straight brick of 2.35 inches thickness added for each ¾-inch increase over the basic diameter.

Likewise, if key brick are to be used the formula may be similarly applied.

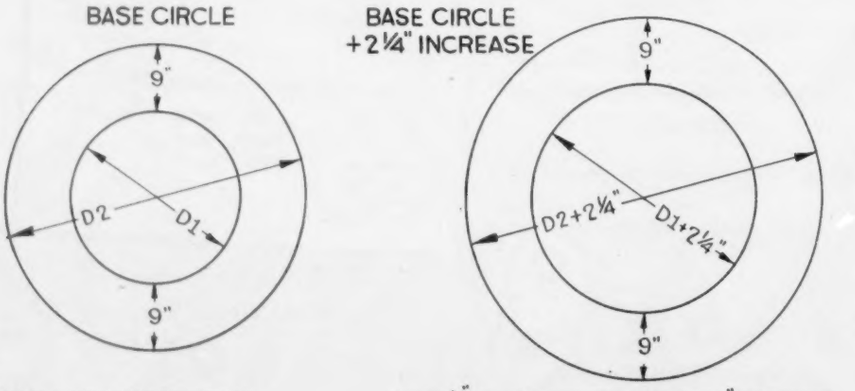
From the foregoing, it can be seen that the proposed method requires one set each of arch, key and wedge shapes whose respective nonparallel faces are radial to a circle of some basic diameter; and further, that it is not necessary to carry the present standard sizes. A further change in the dimensions of straights is required, so the thickness, instead of being 2.50 inches as at present, would be 2.35 inches.

The advent of insulating firebrick has made it possible to supply brick of uniform size, as they are ground to dimension. While grinding, it seems that the proper method would be to adopt standard radial and straight dimensions which, when adhered to, would result in bricks which truly fit and permit easy assembly of circular sections of all diameters.

The Babcock & Wilcox Co. has for many years supplied its insulating firebrick ground to fit the exact circumference of arches where this has been specified. The success of this method as a special application strengthens the belief that failures of sprung arches, instead of being attributable to faulty brick occur chiefly because present standard shapes and sizes of brick do not fit. This gives rise to irregular point contact rather than face-to-face contact between them. In turn, such contact sets up uneven stresses and pinching of the brick when expansion of the arch takes place when heated.

Grinding insulating firebrick to fit arches of specified diameters, while successful and desirable, requires special grinding for each individual radius encountered on each installation. The same results can be obtained more easily by the use of the proposed method of standard sizes which makes for universal application of standard shapes.

The shapes used permit accurate circumferential dimensions with an even number of radial tapered shapes and "pi" straights. By this means, a majority of the shapes in



D1 π = CIRCUMFERENCE
D2 π = CIRCUMFERENCE
BASE CIRCLE OF ALL-RADIAL BRICK

(D1+2¼") π = CIRCUMFERENCE +7.06" INCREASE
(D2+2¼") π = CIRCUMFERENCE +7.06" INCREASE
BASE CIRCLE RADIAL BRICK +3 STRAIGHTS OF 2.35" = 7.05" TO FIT 7.06" INCREASE

Fig. 3—Outer and inner circumferences have the same increase when the diameters are increased the same

an arch or a circular structure would be radial shapes which, when used alone, would turn a circle of a given or base diameter. Where the diameter of the arch or circular structure is in excess of this base diameter, one "pi straight" 2.35 inches would be inserted for each ¾-inch increase of this base diameter.

As most furnace dimensions are given in feet and inches and since the present firebrick series bears no dimensional relationships to the mathematical formula for a circle of given diameter, the present firebrick series never truly turns a circle of given dimensions by the use of a whole number of tapered and straights. By the proposed system, insofar as the thickness of the "pi straight" is chosen because of its relationship to the mathematical formula of a circle, a whole number of shapes will always result from the use of the number of radial tapered shapes for the circle of basic diameter plus one "pi straight" for each ¾-inch increase in diameter over the base diameter (or ⅜-inch increase in radius).

As an illustration, assume a base diameter of 4 feet 6 inches. Assume, further, that 96 radial shapes alone will turn this circle. With these data as a basis, the proposed system will permit the following combinations of whole shapes:

Diam. of circle	Radial shapes	"Pi" straights
4'-6"	96	0
4'-6¾"	96	1
4'-7½"	96	2
4'-8¼"	96	3
4'-9"	96	4
5'-0"	96	6
5'-6"	96	16

By the contrast, the present series does not turn circles of the same diameters without fractional parts:

Diam. of circle	No. 1 wedges	Straights
4'-6"	90.4	0
4'-9"	91	3.37
5'-0"	91	7.07
5'-6"	91	14.69

Thus, since it is impracticable to use, for example, 3.37 or 14.69 straights, either the whole number is used and the fractional part made up by mortar, or the next highest whole number of straights is chosen. This results in a firebrick arch or circle which does not conform to the circle desired and is, therefore, impossible to make good face-to-face contact between the firebrick shapes.

These involved calculations, and the foregoing tabulation of shapes, indicate the difficulty of obtaining an accurate count of the several shapes involved in any arch or circular structure. On the other hand, the rule which the proposed system involves, "one pi straight for each ¾-inch excess above the base diameter," is simplicity itself, involves no tables, and only the simplest calculations, and always gives a whole number of brick shapes.

While the desirability of building arches or other circular structures with the use of radial shapes is apparent, this can only be done at present when the shapes are especially ground to the specified radius or in those few instances where standard series shapes exactly turn the desired circle.

With the proposed system, it would only be necessary to carry "pi straights" and radial shapes. From these stocks, orders for arches of any dimension could be shipped according to a simply-determined brick count and without the necessity of "custom grinding" but with results comparable to such special work.

One large steel company has used the author's design in all of its blast furnace linings for several years. It is found that the bricks of the proposed dimensions are easy to lay and that they actually fit the constantly changing diameters encountered in blast furnace structures.

•

Engineering Problems In Plastics Discussed

■ *Plastics in Engineering*, by J. Delmonte; cloth, 616 pages, 6 x 9¼ inches; published by Penton Publishing Co., Cleveland; supplied by STEEL, Cleveland, for $7.50.

Progress and extent of applications of plastics to design problems are emphasized in this work. The author is a recognized authority who has gained much of his knowledge through first-hand experimental work and actual application. At present assistant to the chief engineer, Chicago Flexible Shaft Co., Mr. Delmonte also conducts a course on plastics at Armour Institute graduate school, Chicago.

Since successful applications are achieved only when the designer understands the potentialities, as well as the limitations, of the materials with which he deals, advantages and disadvantages of plastics are discussed at length in terms of various engineering problems. Numerous tests conducted by the author are cited to bear out these distinctions and data conveniently tabulated and classified for easy reference aid in understanding. Analysis of some important engineering properties of plastics also is made in terms of the fundamental nature of the materials and correlated phenomena, such as condensation and polymerization.

In addition to the survey of engineering features, several chapters have been devoted to chemistry of plastics and the art of molding. Review of the raw materials employed in plastics, chemical reactions involved in their formulation and methods of compounding serves as an introduction. This information is organized conveniently for ready reference. The chemical background is essential to the correct scientific analysis of problems arising in the molding of materials and their behavior in service. Inasmuch as most plastics utilized in design are applied as molded articles, a comprehensive analysis is given of molding problems and mold designs. The laminating, casting and extruding of organic plastics are discussed similarly.

While designers may not ordinarily consider surface coatings and synthetic rubbers in terms of plastic materials there are many close relationships. A chapter devoted to each of these subjects bears out these connections and discusses the engineering properties.

This work takes rank as the first prepared directly for the designer on the subject of plastics and their potentialities and applications. As the plastics industry continues to expand through development of new materials and refinements in the art of forming them, this book will be found increasingly valuable.

A.S.T.M. Standards in Three New Volumes

■ *A.S.T.M. Standards*, 1939, *Part I*; cloth, 1335 pages, 6 x 9 inches; published by American Society for Testing Materials, Philadelphia; supplied by STEEL, Cleveland, for $8; in connection with Parts II and III, nonmetals, any two at $15, all three $22.

Part I in the series of three relates only to metals. It has been extensively revised and enlarged, containing both standard and tentative specifications and tests. It covers 300 specifications, tests and definitions, 180 of ferrous metals, 105 of nonferrous metals and alloys and 15 applying to both.

Specifications, methods and definitions presented in this volume are used as standards for engineering materials because they are competent, unbiased, widely applicable and authoritative. They are based on best commercial practices, adequate scientific research and sound engineering judgment. Each is formulated and recommended by a standing committee of technologists well informed on the subject.

The new edition contains many new features, including double-column format, improved editorial style, simplified subject indexes and two tables of contents, one by subject and one by serial designations.

Part II is devoted to constructional nonmetallic materials, 351 specifications; Part III to general nonmetallic materials, 245 specifications.

BETWEEN HEATS WITH *Shorty*

■ Say Fellers:

While brousin' through the sheet mill last week, noticed a picture of a feller I hadn't seen or heard of for a long stretch. There 'twas hangin' on one of the locker doors not far from the doublin' machine servin' No. 4 hot sheet mill.

"Bill Melaney, sure as I live," I sez, and turnin' to "Dinty" Moore, a catcher takin' his spell on the 'nitial carved bench, I sez, "Dinty, what 'as become of the Ol' Timer?"

"Oh, Melaney," sez he, "understand he retired first of the year and now 's livin' in Pittsburgh. Fine ol' gentleman, Melaney is. 80 years ol' this Dec. 10. As a kid he first started doublin' in the hot mill. In those days 'twas nothin' for a roll to let go now 'n then, and when they did you'd see the Ol' Timer walkin' down the hot mill floor with the boss the next day or so 'xplainin' what the trouble was all 'bout. An' Melaney always 'peared to have the right dope."

"Didya ever hear where he learned the business, Dinty?"

"Naw, never did 'xactly, but he'll tell ya if you'll ask 'im. And boy, he'll keepya settin' on the edge of your chair when you get 'im started talkin' sheet mill stuff."

Never Gotta Better Welcome

You know fellers, this is 'xactly what he did. I rang his door bell few days later and when he grabbed my hand and drew me over the door mat I knew then I was in the presence of the wholesome gentleman that the boys up at the mill calls the "Ol' Timer."

He directed me to a red leather fireside chair, and with a hand outstretched he sez, "Take a seat, Shorty, in the chair some of the ol' hands in the business gave me at a luncheon at the Duquesne Club in Pittsburgh last Dec. 27."

Then I understood. The best was none too good for his guests. No wonder he had won his way into the hearts of his associates and friends engaged in the manufacture of rolls—J. S. Ervin, W. E. Troutman, W. H. Seaman, D. H. Slonaker, Frank Cordes, William Goudy, W. C. Snyder, an' the like.

After seatin' himself opposite me and clasping his two hands over his right knee, he sez, "How's the mill rollin' now? How's the boys standin' it these warm days? How much iron you knockin' off the hot mill rolls in an 8-hour trick?"

Tells 'bout Ol' Days

I sure was on the edge of that red chair holdin' on to the sides for all I was worth as the "Ol' Timer" turned his memories back to the days when the wrought iron roll was the "village queen," when they used rope drives and other things 'fore I ever heard a pair of sheet bars bump into the roughin' mill rolls.

The "Ol' Timer" was 17 when he left high school to get a job so as he could lighten the financial load of his Dad. He started servin' a 4-year 'prenticeship in roll turnin' and design under his Dad at a mill on the Ohio river near Portsmouth, O. Roll turnin' then was secret stuff, chuck full of guesswork and, he got $3 for a week's work of 10 to 12 hour tricks. When he laid down his tools after usin' them 4 years, he was a full-fledgd roll turner. Things started comin' his way.

He packed his belongin's, went to Pittsburgh and started roll turnin' for a firm makin' chilled and other type rolls. They were havin' lotza trouble in the roll foundry and when the "Ol' Timer" tried to set 'em straight, the super sez "Kid, your supposed to turn rolls, not to tell a guy 50 years in the game how to make 'em."

Next day the kid put on his walkin' clothes and went over to 'nother shop makin' chilled rolls. He sold what he had in his head and started workin' as foreman and roll designer. After many years on this job, he decided to take a correspondence course and every evenin' from 7 until 10 o'clock, six nights a week for two years he burned the ol' student's lamp when the dinner dishes were cleared 'way.

Few years later they untied the strings on the shoes of the general manager, slipped the "Ol' Timer's" feet in and he wore those shoes for eight years when the plant was sold. In 1909 he went to work for the National Roll & Foundry Co., Avonmore, Pa. They printed "Sales Manager" after his name on the door, and that name was there for 31 years. On Jan. 1, 1940 he closed down the roller top of his desk, turned the key over to the boss and walked away from the plant with the tread of a conqueror toward home after more than 62 years out in the world on only four jobs brushin' shoulders with the roll makin' fellers. An' all the time he kept studyin' how to take the "guess" out of roll makin'. Not bad I'd say. Huh?

Before 'im was the temptation to be satisfied with meager attainments and the inducement to turn 'side to softer and easier situations. But this wasn't in the makeup of the "Ol' Timer." He restrained every temptation to relieve his task and continued to push his way ever up to the heights.

When I got back to the mill, I was tellin' some of the fellers 'bout my visit with the "Ol' Timer"—how he grasped life with strong and eager hands and shaped it well, jus' like the fellers over on the open-hearth floor shape up their heats of steel.

"Yeh," sez Red Brown, "you gotta light another's torch before your own goes out and thats 'xactly what the "Ol' Timer" has been doin' all these years with the young fellers comin' up through the ranks."

"You've got the right dope, Red," sez Zeke Webster, the slab yard craneman. "You can't begin too early to share your faith with the younger generation."

"Son, you're sayin' some true words. Got some kids up home myself and I find you gotta make friends with youth. You gotta help 'em see the vision and at the same time to set their feet in the way of its conquest."

Well, fellers, thats the story of the 'Ol Timer, W. G. Melaney. Drop in on 'im at 5357 Broad street, Pittsburgh, and pay 'im a call. If it's on a Monday, you'll find 'im readin' STEEL, I betcha.

All the fellers up at the mill are sayin', "Good luck, Ol' Timer". And I'm addin' a couple of compliments of the day myself. I'll be seein' you.

"Shorty" Long

Porcelain Enamel Acid Test is Revised

■ Product standards section of Porcelain Enamel institute, 612 North Michigan avenue, Chicago, recently issued a revised edition of the bulletin on acid resistance of porcelain enamels. Revision now makes it possible to check the finished porcelain enameled product by means of a spot test.

Lower Shell of J & L Eliza Stack Replaced with Little Disturbance

■ WHEN Jones & Laughlin Steel Corp.'s No. 5 Eliza stack at Pittsburgh was repaired and relined recently, an interesting replacement of most of the shell and mantle was made without disturbing the top structure, incline or downcomers. Upper shell and top structure had been replaced a number of years ago and were in good condition. Lower shell and mantle were considerably older and required replacement which was done by welding a new shell together outside the old for a height of 51 feet. This new shell was laid up against the old and riveted to it at the bottom and again at the upper level of the new shell.

The method used by the contractors, H. A. Brassert & Co., 310 South Michigan avenue, Chicago, was as follows:

The bustle pipe was adequately supported by heavy timber posts. Then its hangers, as well as interfering butt plates and angles, were burned from the shell and removed. Then one section of the outside shell angle at the mantle, extending from one column to the next column, was removed. The shell is supported by 12 columns equally spaced. A new plate section was fitted to the outside of the old bottom ring, the top edge being tight under the bottom edge of the second ring of old plates. A new section of heavy angle was fitted in at the mantle level and welded to the outside of the new plate.

Sides Replaced Separately

This operation was repeated on the opposite side of the furnace. It was not considered advisable to replace the plates in continuous succession around the shell on account of the possibility of "winding" and thus throwing the furnace out of plumb and level. Finally the new bottom ring and its outside mantle angle were all fitted in place and securely welded together but resting on the old mantle. The outside rivet heads in the top horizontal seam of the old first ring plate were burned off along with any other interferences and the second ring, consisting of eight plates, was erected. The bottom of the second ring was securely fastened to the top of the first new ring with 1-inch drift pins securely driven in closely spaced holes reamed through both the old and new plates. Later, these pins were replaced with rivets.

A horizontal inside butt plate was shop welded to the top edge of this second ring of shell plates and heavy butt plates were field welded over the outside vertical joints, which also were welded continuously. In this manner seven rings of plates were successively erected and welded together. Holes were provided in the horizontal butt plates and bolts were used for helping in assembling of the plates in the next upper ring.

The top ring of the new shell was drawn in to fit against the lower ring of the plates which did not require renewal. A horizontal row of holes was reamed in the top edge of this new top ring and through the old shell plates, and drift pins were driven to help take the load of the furnace top. As soon as the brick had been removed down to this point, these pins were replaced with rivets.

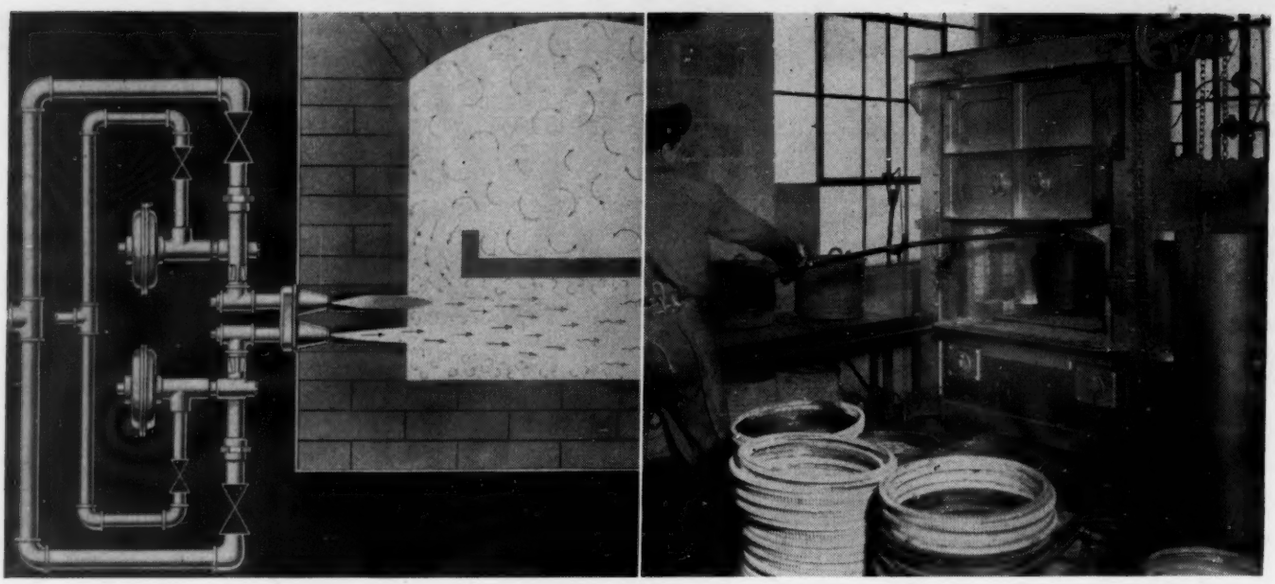
The old shell then was burned out in pieces of a size that could be safely handled to clear the workmen's rigging, and the inside joints of all new plates welded.

The old mantle was cut out, one section at a time, extending from the center of one column to the center of the next column, and 12 sections of mantle plate, with 12 splice plates over the columns were worked into place, until the whole ring was assembled and completely welded together. The old bottom or first shell ring with its inside angle was removed, a new inside angle was securely welded to the new mantle and shell plate, the drift pins at the top of the first ring were replaced with rivets, and 12 heavy brackets equally spaced between columns were welded to the inside of the shell and mantle.

An interesting feature was the erection of the new shell plates around the brackets which supported the downcomer pipes and which were riveted to the old shell. Slots were provided in the new plates, and these new plates were slipped over the old brackets. The edges of the slots were 100 per cent continuously welded to the old brackets, new bracket angles were fitted on the outside of the old bracket angles, and after the old shell plate had been burned away with the old angles, a large reinforcing plate was welded on the inside of the new shell, producing a tight shell and a satisfactory job. The time required to complete the work was seven weeks.

Pigeonholing Bar Steel

■ Illustrated is a horizontal storage rack system for bar steel together with facilities provided for reaching the higher tier of pigeonholes. Main portion of storage is divided vertically into six levels. Bar stock is stored in these divisions according to size, shape and analysis. Above main body of the storage are additional racks in which similar steel is placed. An ingenious method of handling is provided in form of a rubber tired truck or trailer. Trailer is constructed so it can be hooked behind a truck and pulled any distance. In the illustration, a quantity of steel bars has just been delivered by overhead crane to a position on the truck where it may be counted and shoved into one of the pigeonholes comprising the upper tier storage. In order to increase the height of the truck a trestle has been set up on its platform



Left, diagram showing how air is injected at low temperatures to give a large volume of hot gases for uniform and rapid heating of work. For high temperatures, both nozzles function in the usual manner. Right, this Conjecto-Firing unit at Wohlert Corp., Lansing, Mich., reduced cost of normalizing starter ring gears by $5 per ton. Furnace also used for many drawing operations

Firing System Has Wide Temperature Range

■ A NEW method of firing convection type gas furnaces throughout a wide temperature range has been developed. Now it is possible to do most heat-treating work in the same furnace as a furnace can be constructed to operate over the entire range from 600 to 2000 degrees Fahr. efficiently.

It is commonly accepted that for the lower temperature operations such as drawing, heating by convection is most satisfactory, being faster and more uniform. In recent years this has accounted for the widespread use of batch-type and continuous recirculated air furnace for temperatures up to approximately 1350 degrees Fahr.

Convection heating, however, is dependent on the circulation of a large volume of hot gases. When operating a conventional furnace at low temperatures, the burners necessarily must be turned down. This immediately reduces the volume of hot gases or products of combustion. Hence, at the lower temperatures when it is most desirable to have a large volume of hot gases to promote heating by convection, the conventional furnace produces a minimum volume of hot gases.

To overcome this difficulty a new system of firing, known as Conjecto-Firing has been developed by Surface Combustion Corp., Toledo, O. With this system, an additional volume of air is introduced at low temperature and, immediately upon being introduced to the furnace, is automatically mixed with the hot products of combustion.

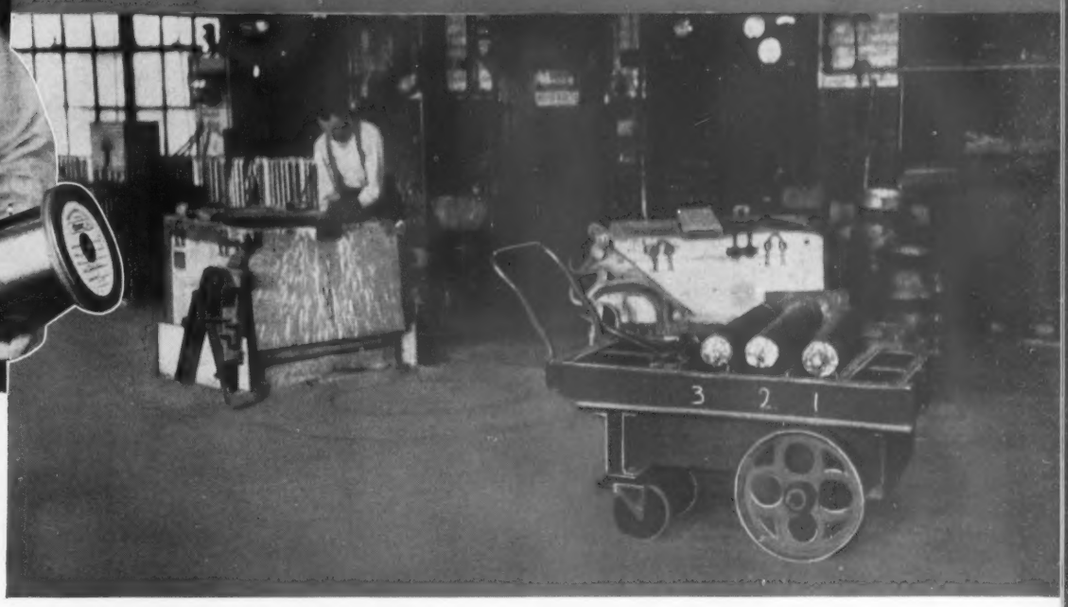
This is accomplished by using twin nozzle burners cast into an integral casting as shown in an accompanying illustration. Each nozzle has an individual tunnel, one tunnel being vertically above the other. At low temperatures, one nozzle functions in the usual manner to completely burn the air-gas mixture within the tunnel. At the same time, the gas supply to the other nozzle is shut off and air is injected through the nozzle and tunnel. As the air leaves the tunnel at a fairly high velocity, it creates an inspirator effect to combine quickly with the hot products of combustion coming from the other tunnel, either immediately above or below. Injection of the air causes no appreciable oxidation or scaling since it is mixed intimately with the hot products of combustion and further because the furnace is below the temperature at which oxidation takes place with any appreciable speed.

Hence, at the lower temperatures it is possible to produce a large volume of hot gases which results in quicker and more uniform heating through convection.

At the higher temperatures required for annealing, hardening, normalizing and carburizing, both nozzles function in the usual manner, completely burning a correctly proportioned air-gas mixture. However, the double nozzle feature makes possible a unique system for close temperature control. The burners can be adjusted so the upper and lower nozzles are of different capacity. When operating at higher temperatures, it then is possible through automatic or manual control to shut off only the high-capacity burners as the temperature of furnace approaches the desired value. When the heat input to the furnace thus is reduced, there remains little possibility of overshooting the desired temperature. This temperature control system also automatically operates a control valve to introduce auxiliary air through the high-capacity burners when they are not needed for firing, thus automatically obtaining the desired convection currents for efficient heating.

It is evident that use of burners employing this principle allows a furnace to operate effectively over a much greater temperature range. It is easy to construct a furnace using these burners so it has a temperature range from 600 to 2000 degrees Fahr. In such a furnace it is possible to perform almost any heat-treating operation since this range covers practically all heat-treating work.

"You can take out just what you put into these furnaces—an essential in producing alloy"



The finished product: Spool of ribbon-type Chromel, bright annealed.

That's the comment of Hoskins Manufacturing Company, Detroit, after using two 500 lb. Ajax-Northrup High Frequency Furnaces exclusively for more than ten years for melting Chromel alloy.

The two Ajax-Northrup Furnaces shown above have been added recently. This plant can melt down a ton of alloy in 1½ hours.

Besides greatly improving the product and insuring uniformity, this company reports a saving of both time and money.

Most of our newest alloys and many other metallurgical laboratory achievements have been made with Ajax-Northrup Furnaces, and in the realm of heating, startling production possibilities are being uncovered every day.

For instance, RCA Victor increased the production of rotors 1000 percent. A plant swedging 5" hollow cylinders increased daily production 2½ times.

Razor blades are treated in a continuous strip, and Ajax-Northrup Furnaces are replacing other methods for selective hardening and annealing of small parts. If you use heating or melting in your plant it will pay you to send for the Ajax-Northrup bulletins.

AJAX-NORTHRUP MELTING FURNACE CAPACITIES: ONE OUNCE TO EIGHT TONS

AJAX ELECTROTHERMIC CORPORATION

AJAX PARK · TRENTON · NEW JERSEY

ASSOCIATE COMPANIES

THE AJAX METAL CO., *Non-Ferrous Ingot Metal for foundry use.*
AJAX ELECTRIC FURNACE CORPORATION, *Ajax-Wyatt Induction Furnaces for melting.*
AJAX ELECTRIC CO., Inc., *Ajax-Hultgren Salt Bath Furnace and Resistance Type Electric Furnaces.*

Handling in Press Work

The application of simple mechanical handling facilities often can completely eliminate hazards to the operator, cut rejects and increase output. One such installation doubles production

■ PRESS operations offer a field where materials handling equipment—often of the very simplest nature—sometimes can be utilized to effect startling improvements, not only in production, but in elimination of restacking operations and increased safety for the operator. While various schemes have been developed to increase the operator's safety, there are still far too many press setups in which the operator must place his hands beneath the dies, either in inserting or removing work or both.

In many such instances, it would be a simple matter to tilt the press so work could be fed to the dies by permitting it to slide down a short chute against stops which would position it accurately, ready for the press operation.

In many setups it is common practice to clear the dies or guides by prying the stamped, punched or notched piece out by hand. Here again the hazard to the operator can be eliminated by introduction of knockout rings and pins to strip the work from the dies automatically, thus freeing the operator from necessity of inserting his hands under the dies.

This also introduces another important factor—the possibility of increased output. By use of self-stripping die attachments, the work can be made to clear itself automatically from the press and to discharge through a chute where a conveyor can be provided to carry it to the next work point. By making it unnecessary for the operator to strip the work from the dies by hand or pick it up and remove it from the press, it is possible for the entire cycle press operation to be accomplished faster, often resulting in important increases in output.

With press inclined at a sufficient angle and with strippers provided to clear the work, it is easy to make provision for the pieces to be stacked automatically as they come from the press. Gathering or stacking flat punched or blanked work may often be quite a time-consuming operation if pieces are small. Also it constitutes a definite hazard where sharp edges may be involved. With the work automatically transferred by the conveyor setup at the discharge side of the press, a stacking device can be installed. Often special attachments can be applied to line up the pieces where these should be stacked in a certain position such as when assembling motor and generator laminations.

Installation Very Modern

Perhaps the installation recently completed at plant of Reliance Electric & Engineering Co., Cleveland, is one of the most complete layouts of the type discussed. The first consideration in designing this installation was to provide maximum protection for the operator who in the previous setup had to insert and remove the blanks by hand from beneath the dies. In addition it was desired to make provision so the blanks could be segregated and stacked automatically as they emerge from the press. The press work in this instance consists of what is known as "separating" or parting with a die, a rotor and a stator lamination from each blank fed into the press. These are laminations for alternating-current motors.

A third requirement in this instance was to provide means to increase the output from the press sufficiently so it would be feasible to operate the press as an integral part of a smoothly moving production line.

In the actual arrangement shown in accompanying illustrations, these requirements have been met to an exceptionally satisfactory degree. The blanks come to the separating press from other stamping operations which have provided the proper sized shaft hole, the correct outside diameter for the finished stator lamination and a succession of notched openings around the periphery of the blank, these openings serving as coil slots for the stator lamination. The "separating" operation performed by the press follows notching of the stator coil slots and precedes the assembly of the stator laminations into finished stator frames.

Before modernizing handling operations in connection with separating, the blank was placed by hand over a plug in the center of the die and the press clutch tripped. After the press had operated, the stator sections slid out through the back of the press into a tote box since the press was tilted at an angle. However the rotor section had to be pried off the plug in the die by hand, constituting a hazard to the operator and slowing down work.

Both types of lamination then had to be picked up by hand, separated into two stacks and lined up—both as to indexing keyways and as to the proper side with relation to the press burrs which had been raised. This again was necessarily a slow operation and offered considerable hazard to the operator's fingers and hands from the sharp edges.

The hazard incurred by presence

Giant Power

for handling materials · steel coils · freight · cargo

...with Exide-Ironclads assembled in steel trays

ELECTRIC INDUSTRIAL TRUCKS, these days, must do more in less time. That means heavier loads and faster handling speeds. Modern trucks are ready for such service. They are stronger, larger, speedier. They need batteries to match . . . giant-powered Exide-Ironclads assembled in steel trays.

This outstanding development permits a higher voltage, higher capacity battery to be placed in the battery compartment of your truck—you can get more battery into the same space. In a typical instance, one of these Exide-Ironclads provided 34% more power and 20% higher voltage. The result is greater speed, a livelier truck, more power, and more materials handled per hour.

Exide
IRONCLAD
BATTERIES
With Exide **MIPOR** Separators
"MIPOR," Reg. U. S. Pat. Off.

To improve performance still further and cut maintenance time, there is the Exide System for better materials handling. It analyzes your handling problems, indicating the proper size and type of Exide-Ironclad for your needs. It includes the Exide Discharge Indicator which eliminates unexpected delays and "tow-ins." And it provides the Exide Charge Control Unit which makes charging an Exide-Ironclad virtually an automatic operation.

Write today for new, free booklet, "The Exide System for Better Material Handling."

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

of the operator's hands beneath the press die was eliminated by revising the construction of the dies so blanks are now fed into the press through a chute as shown in the illustrations. The blanks are positioned mechanically beneath the dies by the use of stops. Knockout rings and pins are used to strip the rotor sections from the die automatically after the separating operation.

The rotor lamination then drops through the die and onto a discharge chute. The stator lamination slides off the dies onto the same discharge chute. This chute, however, is provided with a hole of sufficient size to allow the rotor lamination—the smaller piece—to drop through into a second lower chute.

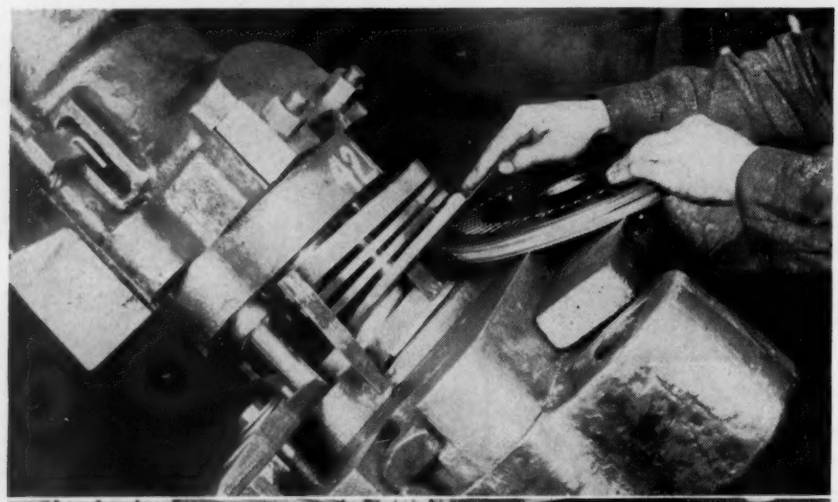
The stator lamination, which is the larger piece, slides on down the upper discharge chute. Stator laminations emerge from this chute and are picked up on a moving rubber belt conveyor which carries them to the stacking unit shown. Here, stacks of lined-up stator laminations can be removed from the spindle without stopping either the press or the stacker unit. A nearby scale permits weighing the laminations out into piles of the correct size to produce finished stators.

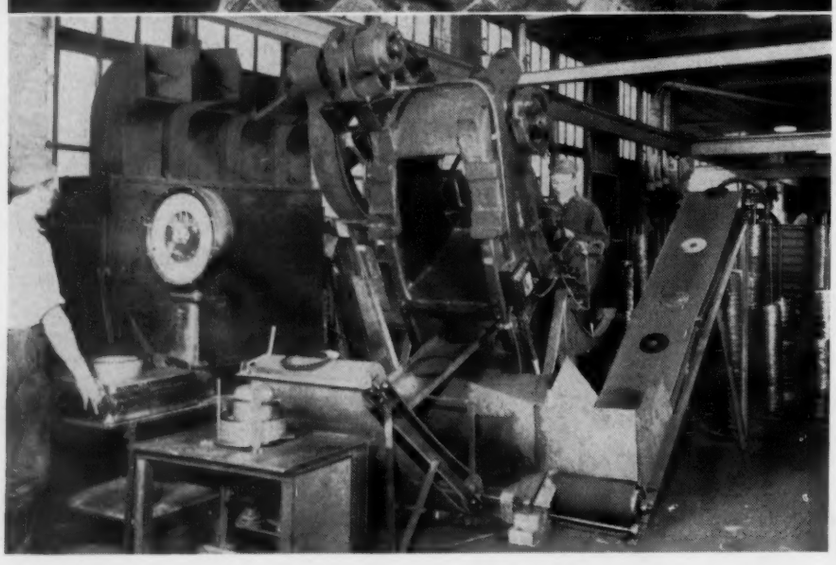
As the rotor laminations slide down the lower discharge chute, they are tilted on edge, rolled sidewise and picked up by another rubber belt conveyor which carries them up and onto spindles on which they are simply stacked. From this point they are removed for notching as required by the specifications of orders going into production at the time.

The complete press, conveyors and stacking unit are used to handle blanks of various sizes in diameters up to 16 inches. For larger blanks up to 22 inches in diameter, the rotor sections are handled as described but the stator laminations, being too big to pass back through the press, are taken out of the dies at the front and are shoved down a special chute provided along the

(*Please turn to Page* 79)

Upper, a short chute delivers work to dies. Guard prevents operator's hands from being inserted between dies. Lower, layout of automatic belt conveyors and stacking units which doubled production at Reliance Electric & Engineering Co.'s plant





Story of Electricity Told for the Layman

■ 48 *Million Horses*, by Humphrey B. Neill; 241 pages, published by J. B. Lippincott Co., 227 South Sixth street, Philadelphia; supplied by STEEL, Cleveland, for $2.50.

This book is the story of the rapid progress in development of electricity since Thomas Edison opened the first central station in New York in 1882. The story is presented in nontechnical terms for the information and education of the reader unacquainted with terms of kilowatts and ohms. It is divided into six parts: Energy, light, comfort, tele-magic, transportation and industry, with 82 photographs supplementing the text.

New Preparation Seals And Protects Floor

■ A transparent penetrating floor seal, Bakeflex, announced by Flexrock Co., 2300 Manning street, Philadelphia, not only makes nearly all types of floors fire and dirt resistant but also increases their life. The seal has a faint amber color and may be used as a filler. No preparation is required in its application. It is applied either by a cloth or brush.

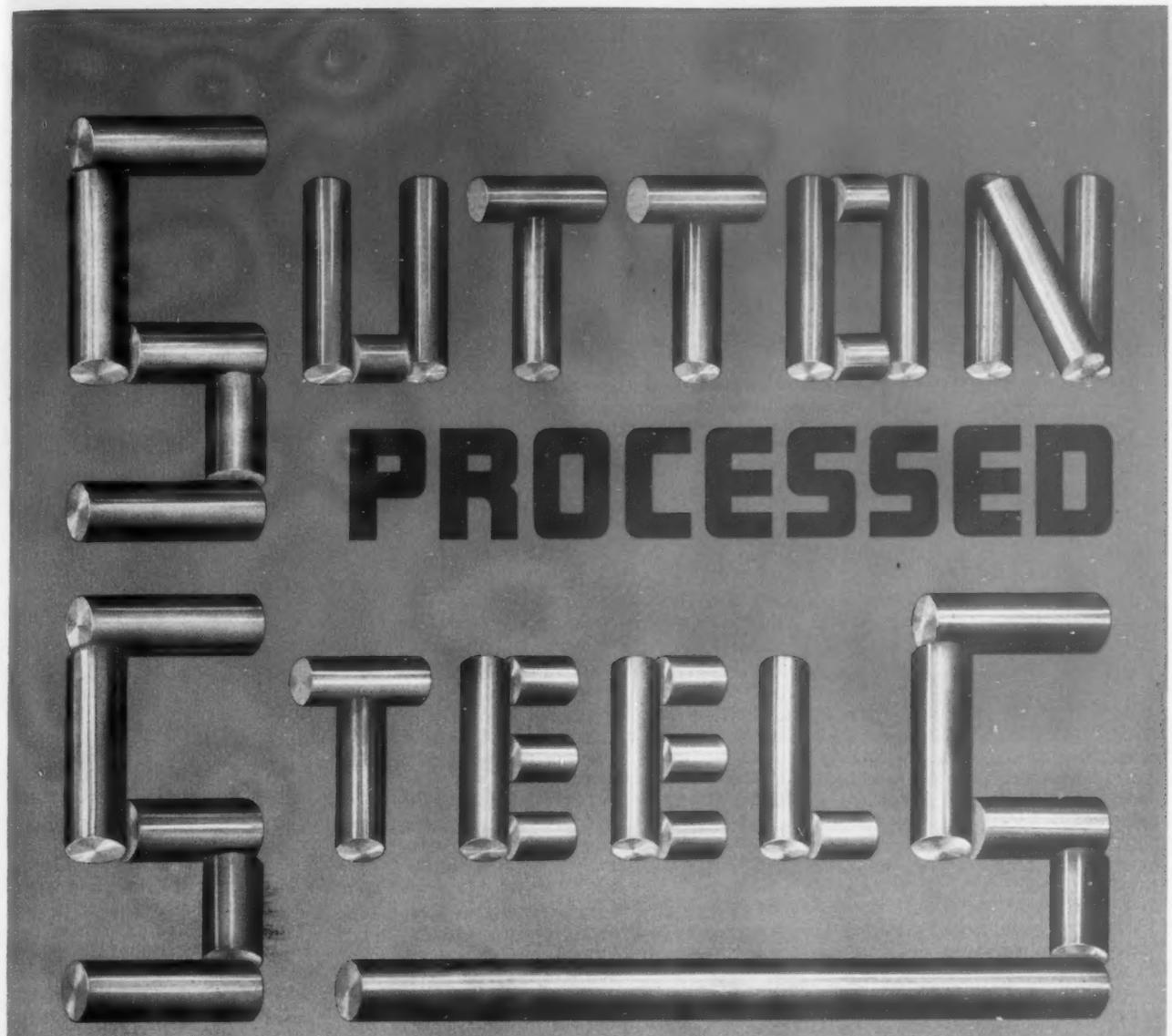
Steel Switchgear

(*Concluded from Page* 53)

part of many enclosed equipments such as the metal-clad switchgear; Fig. 3.

Metal-clad switchgear is a type completely enclosed in a sheet-steel structure. Here transformers, buses and connections are placed in separate, grounded compartments and isolation of parts by steel barriers is even more complete. A feature of steel in such equipment is that it localizes any damage due to circuit faults. Provision is made by means of self-coupled disconnecting devices for mechanically removing the breaker from the housing for inspection or replacement of contacts.

For outdoor installations, metal-clad and so-called steel "switchhouses" have been in general use for some time. Fig. 4 shows a typical outdoor "unit sub-station," all steel enclosed. To weather-proof such a structure, special ventilating measures, compact and exceptionally rigid device mountings and heavy base designs are utilized.



• ACCURACY • HIGH FINISH •
LINE STRAIGHT • IMPROVED
PHYSICALS • FREE MACHINING

Samples on Request

SUTTON ENGINEERING CO • PARK BLDG., PITTSBURGH
(PLANT—BELLEFONTE, PA.)

Electric Welded Chain

Links shaped automatically to form chain. Success of highly developed resistance welding procedure depends on operator's skill. Links forged as welded. Chain heat treated, prestretched

By **A. G. ANDERSON**

Foreman, Chain Department
Yale & Towne Mfg. Co.
Philadelphia

■ MANUFACTURE of high-strength chain for Yale hoists is a most important part of production operations at the Yale & Towne plant, 4530 Tacony street, Philadelphia. Here an entire floor is given over to manufacture of chain in sizes to handle rated loads from ¼ to 3 tons.

Raw material comes into the plant in the form of coils of hot-rolled bar stock which has been drawn down accurately to the size desired.

In the first machine, the stock is fed through straightening rolls and cut into lengths of correct size for the chain in which the links are to be used. A special cutting-off mechanism is used which produces a pointed or conical end as shown in Fig. 1 instead of a nonuniform wedge-shaped end as would be produced by ordinary shearing methods.

Shape of the ends is most important for successful resistance welding. By utilizing a slight conical end with the point exactly centered, heating during welding starts at these points and progresses toward the circumference of the cross section so when the metal is forced out during upset there will be no inclusions or improperly heated sections of metal in the weld. Thus shaping of ends is watched carefully to see that this operation is done correctly.

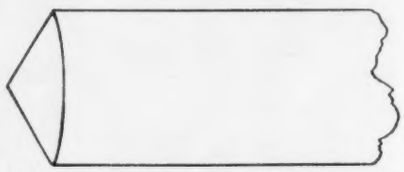
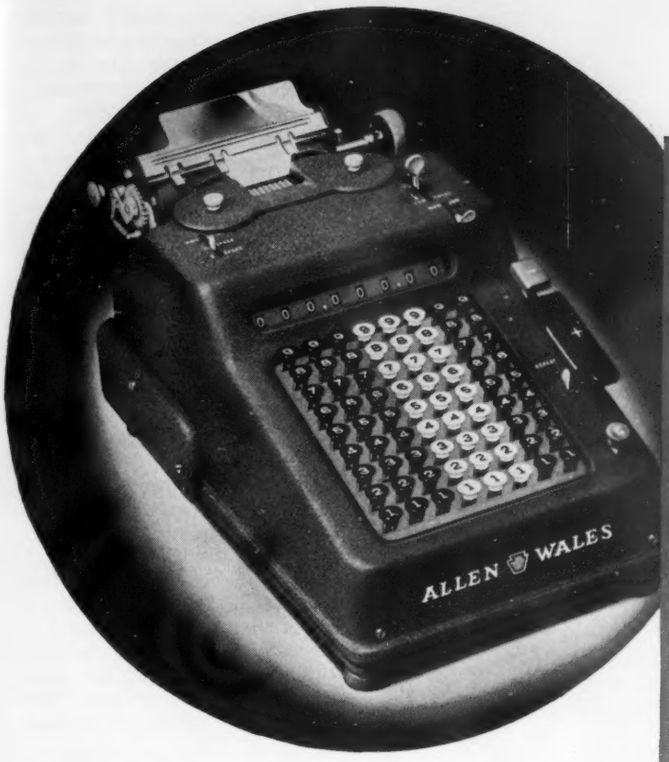


Fig. 1—Rod is pointed as shown to improve quality of weld

After links have been straightened, cut to length and ends prepared, they are fed into a chute on a second machine which forms the links into the continuous chain.

Figs. 3, 4, 5 and 6 show four consecutive views of forming operations in this machine. In Fig. 3, a formed link is being removed from the mandril by two arms which grip it at each end. As these arms retract, pulling the link from the mandril, they also turn the link 90 degrees to the vertical position shown in Fig. 4. At the right in each of these four figures may be seen the chute carrying a supply of unformed links ready to be fed into the machine. The end of the next straight bar (unformed link) can be seen emerging from the chute in Fig. 3 part way be-

Fig. 2—Flashing off excess metal in making the resistance welded joint in a link



PENNSALT CLEANER

cuts metal cleaning cost 60% for Allen Wales Adding Machine Corporation

ALLEN WALES Adding Machines are precision instruments requiring extreme care and the highest standards of quality in their manufacture. The cleaning of metal parts, such as springs, bearings, key arms, and others must be perfectly done if accuracy and excellence of finish are to be maintained through the finishing operations.

For this reason one of the Pennsalt Cleaners was selected after thorough tests in which it proved its exceptional efficiency in removing grease and oil, and in preparing the surfaces for plating. Outstanding economies resulted. Not only is the cleaning time cut in half through the elimination of a precleaning operation, but cleaning costs were reduced approximately 60%. The cleaning solution is dumped only about every 100 days, showing the long lasting power of Pennsalt Cleaners in *electrolytic* cleaning.

Orthosil—the original Pennsalt Cleaner—quickly made an important place for itself in heavy duty metal cleaning throughout industry generally. Companion cleaners, meeting every need with laboratory precision, have been developed for varied and extreme requirements. The entire line is known today as the Pennsalt Cleaners.

They all have unusual dissolving and emulsifying action, and enormous lasting power. Their action is fast and efficient. Why not let one or more of them start saving money in your processes? Write Dept. E and we will gladly supply full details. Pennsalt Cleaner Division, Pennsylvania Salt Mfg. Co., Phila., Pa.

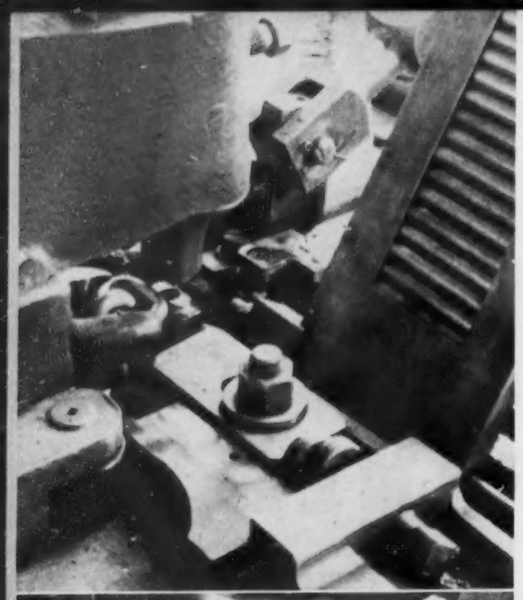
Other Pennsylvania Salt Chemical Products used in large quantity by industry

Anhydrous Ferric Chloride • Sal Ammoniac • Carbon Tetrachloride • Soda Ash • Mineral Acids • Caustic Soda • Kryolith • Acid-Proof Cements

PENNSALT

CLEANERS FOR INDUSTRY

PENNSYLVANIA SALT
MANUFACTURING COMPANY
Chemicals



tween the bottom of the chute and the mandril.

In Fig. 4 this straight link can be seen in position completely discharged from the chute. Here the carrier holding the link just formed has revolved 90 degrees to the vertical position, the mandril has closed, the toggle clamp mechanism just behind the mandril has started to close, clamping the new blank securely in position ready for forming. The toggle mechanism in extreme open position can be seen at top center of Fig. 3. In Fig. 4 the toggle is partly closed, and in Figs. 5 and 6 it will be noted that the toggle is completely closed.

In Fig. 5, the two back slides parallel with the toggle have started to form the new link. The slide on the side of the mandril visible here has advanced to bend the end of the link about 45 degrees. Note slide carries a circular forming guide pivoted in the slide to reduce wear at that point and to roll the link around the mandril. A second slide on opposite side of the toggle mechanism has bent the other end of the link the same amount.

In Fig. 6 the rear slides have done their portion of the link forming. They have bent each end of the bar approximately 90 degrees and the slide in the immediate foreground has been operated to wrap the end of the bar completely around its half the mandril. At the same time, a second slide on the opposite side from that shown in Fig. 6 has closed that end up also, forming a completely closed link ready for welding.

When the slides in Fig. 6 retract, the side grippers will release their hold on the previous link and grip the newly formed link to remove it from the mandril as shown in Fig. 3. From this point on the operation is repeated.

Entire series of operations takes place at the rate of about 30 per minute in the forming of ½-inch diameter bars to make what eventually will be 2-ton chain. In actual operation, the entire series of forming movements takes place so smoothly and rapidly that it is impossible for the eye to follow them.

Chain from the forming machine is discharged into a box in any continuous length desired. Of course there is a separate forming machine available for each size bar. Bar or rod sizes include ¼-inch diameter to make ¼-ton chain, ⅜-inch diameter for 1-ton chain, ½-inch diameter for 2-ton chain and 9/16-inch diameter for 3-ton chain.

From this point the chain goes through the welding machines, one of which is seen in Fig. 8 with a close-up of the same machine in Fig. 7. These welding machines are unusual in that they not only provide for actual resistance welding of the joint, but have built into them a mechanism which trims off upset metal or flash and forges the joint while still hot. This flash trimmer and forging equipment are built into upper portion of the machine which employs massive construction to withstand the terrific vibration set up during trimming and forging.

Every Other Link Welded

Trimming and forging operation is done by four pairs of dies carried on two rotating members, one above and one below the chain, both of which can be seen clearly in Fig. 7.

Thus operator not only controls actual welding operation but trimming and forging of the weld as well. The chain passes from right to left past the operator who welds every other link. Then when the entire length of chain has been passed through the machine, the chain is turned 90 degrees and the links that were missed the first time then are welded. This procedure makes it unnecessary to turn the chain 90 degrees for each link as would be required if each link were welded in succession.

The operator initiates making of the joint by pressing a foot pedal which moves the contactors in to engage the link. Then he trips a switch with his left hand, which starts the current to flow through the link, causing its temperature to rise at the point where the two ends touch. The large lever shown at the right in Fig. 8 controls the movement or "squeeze" applied to the link. It is movement of this lever which upsets the metal at the weld.

At this point, the cone shaped ends of the link play their important part. As the current heats the small amount of metal where the points of the two ends touch each other, the metal softens and, the operator, by exerting pressure on the upset lever, causes this metal to flow toward the circum-

Fig. 3. (Top)—Here a finished link is being removed from the mandrel which has parted to permit closed link to pass

Fig. 4 (Next to top)—Finished link is rotated and positioned against mandrel ready for new link to be formed interlocking with it. New blank is seen emerging in line with bottom of magazine at right

Fig. 5. (Next to bottom)—Ends of new blank have been bent approximately 45 degrees here

Fig. 6. (Bottom)—Link is being completed by wrapping ends around mandrel. Slide in immediate foreground is finishing the forming of the link

ference. As additional metal is heated to a temperature at which it will flow, it also is forced outward with subsequent movement of the upsetting lever. This causes only clean, correctly heated metal to remain in the joint and eliminates the inclusions and foreign matter which otherwise might be left in the joint to reduce its strength.

Upsetting lever also is connected to a cam which opens the contactor controling application of the welding current. Thus when metal is soft enough to flow and permit upsetting lever to be moved a certain distance, current is turned off automatically. Amount of upset is determined by the operator, his experience telling him by the "feel" of the lever when sufficient heating and upsetting have occurred.

"Y" Stamped in Each Link

At this point, the operator sets the forging hammers into operation. Four sets of forging dies located on two wheels above and below the work are hammered down on the still white-hot joint in rapid succession. Mechanism is connected with ratchetting device to change the die sets in unison after about five strokes of the head. First die set trims off flash roughly, second die set trims to closer tolerance, third set forms the metal to cross section nearly identical with that of the rest of the link and fourth set includes a die stamping the letter "Y" on each link. This is the identifying mark of Yale chain. Working the metal while hot as is done by these forging hammers has a very beneficial effect on the weld and adjoining metal.

Entire series of operations is performed rapidly to make up to 5000 links of ¼-ton chain per 8-hour day. Production from machines welding links from ⅜-inch material is about 4200 per day. Similarly, the 2-ton chain utilizing ½-inch material is welded at the rate of 3400 links per day, the 3-ton chain utilizing 9/16-inch material, the largest welded here, is welded into chain at the rate of 1600 links per day. This latter chain has elastic limit of 18,000 pounds with a breaking point between 28,000 and 29,000 pounds.

Fig. 2 is a view of the welding operation and illustrates how some of the excess metal is burned off or "flashed" during the welding process. Fig. 8 also shows a link being welded.

After welding, all links are inspected carefully for chips which might be pressed into the weld during forging and which would leave a hole when they subsequently fell out during use. Any rough spots on or near the weld also indicates an unsatisfactory link.

(*Please turn to Page* 80)

IT WILL PAY YOU TO CHECK UP ON THIS LATEST HAND LIFT TRUCK

...and here's why

The new *Transliftor*, universal lift, multi-stroke, heavy duty, hand lift truck, incorporates into its design the findings of years of research directed toward better construction and more efficient operation. It will carry heavier loads* at less cost and with less effort. Note these *Transliftor* advances:—

1. Hydraulic release check . . . never drops a load. Its cushioning action gradually lowers the load, safeguarding it, the truck, operator and floor.

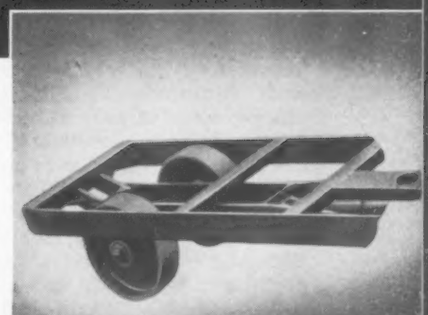
2. Telescopic bar frame . . . gives greater floor clearance. Platform rails are located outside the frame rails for better support.

3. Selective lift . . . This lift has a pump action moving in an oil bath for easier operation, and permits either full strokes for quick lifts, or short strokes for heavy loads.

4. Torsion-type rear link . . . provides greater stability to the load, acts as a side sway eliminator and reduces wear.

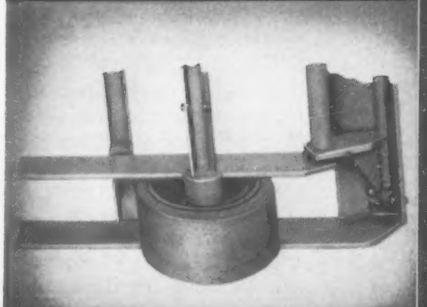
Your Yale representative (he's listed in your classified telephone directory) will be glad to tell you of other *Transliftor* features. Ask him about the universal lift, replaceable bearings, free handle control, and machine faced roller bearing steel wheels. Or write to us direct.

* Capacities 3,500 to 5,000 lbs.



TELESCOPIC BAR FRAME

SELECTIVE LIFT MECHANISM



TORSION-TYPE REAR LINK

THE YALE & TOWNE MFG. CO.

PHILADELPHIA DIVISION, PHILADELPHIA, PA., U. S. A.

IN CANADA: ST. CATHARINES, ONT.

YALE

Makers of Yale Hand Chain Hoists, Electric Hoists, Electric Industrial Trucks, Hand Lift Trucks and Skid Platforms.

Machining Hard Alloy Steels

Certain high-strength steel alloys appear to be machinable even after they are heat treated to high hardness levels. Use of such materials in gears, for example, permits their redesign to save appreciable weight in addition to obtaining the important advantage of avoiding possible distortion and warpage from heat treatment after machining as is conventional practice

■ INDUSTRIAL development in the art of machining alloy steels has progressed to the point where heat-treated parts can be machined with conventional high-speed-steel cutting tools at hardnesses hitherto considered commercially impractical. This new advance in processing technique, facilitated by modern machine tools of more rigid construction to insure smooth operation under heavy loads, is largely dependent upon the use of nickel-chromium-molybdenum steel of SAE 4340 or allied types for parts that must be machined at 450 brinell or higher.

Until recently, the upper limit of commercial machinability was considered to be between 350 and 375 brinell under normal circumstances, and stressed parts were designed with this maximum limit in mind. When hardness in excess of this proved necessary, usual practice involved machining the parts prior to heat treatment.

For removing large amounts of metal with maximum speed and efficiency, machining while the steel is in a relatively soft condition (prior to heat treatment) is undoubtedly the most economical practice. Nevertheless, under certain circumstances machining before heat treatment has inherent disadvantages. Distortion and warpage are factors which accompany heat treatment and while their effects may be minimized by various means, complete elimination of dimensional changes is extremely difficult. Consequently it is usually necessary to resort to straightening operations after heat treatment or to leave sufficient excess metal in the initial machining operations to allow for possible warpage and then grind or otherwise finish the part to the required dimensions.

Either of these procedures has undesirable aspects. The straightening operation can introduce strains in the finished part which may be detrimental to service properties. The finishing operation subsequent to heat treatment requires setting up and realigning the part once more in the machine tool. This may endanger dimensional accuracy if the surfaces ground or shaved in this final operation must be related accurately to surfaces finished prior to heat treatment.

Another factor to be considered is the danger of strains resulting from the quenching operation. When a finished or even rough-machined part is quenched or otherwise cooled rapidly, internal stresses are developed which can be particularly severe at edges, sharp corners and fillets, at the periphery of holes, or abrupt changes in section thickness.

Obviously, any technique permitting the economical machining of heat-treated steel at high hardness levels has the advantage of avoiding the undesirable features just described and simplifies heat treating and machining practice. In some instances it may permit elimination of slower, more expensive grinding operations. The use of nickel-chromium-molybdenum steel has proved useful in these respects and is becoming increasingly popular for commercial applications in which machinability at high hardness is desirable.

In the automotive industry, heavy-duty truck axle shafts are produced of SAE 4340 and splined on a hobbing mill at a hardness of 400 to 444 brinell to avoid necessity for repeated heat treatment of the splined end after machining. Cutter speed for this operation is reported as 72 revolutions per minute with a feed of 0.0057-inch per revolution per minute and a surface speed of 84 feet per minute. An average of 46 pieces per cutter grind is obtained. In certain cases the hardness of the shaft was increased to 500 brinell and machining conducted satisfactorily at reduced speeds and feeds.

The aircraft industry has found it profitable to use SAE X-4340 which is heat treated to between 415 and 450 brinell for propellor shafts, crankshafts, propellor spiders, undercarriage parts and engine mount fittings, all of which are highly stressed in service. Fig 1 shows hydromatic propellor

TABLE I

Chemical Composition—SAE X-4340

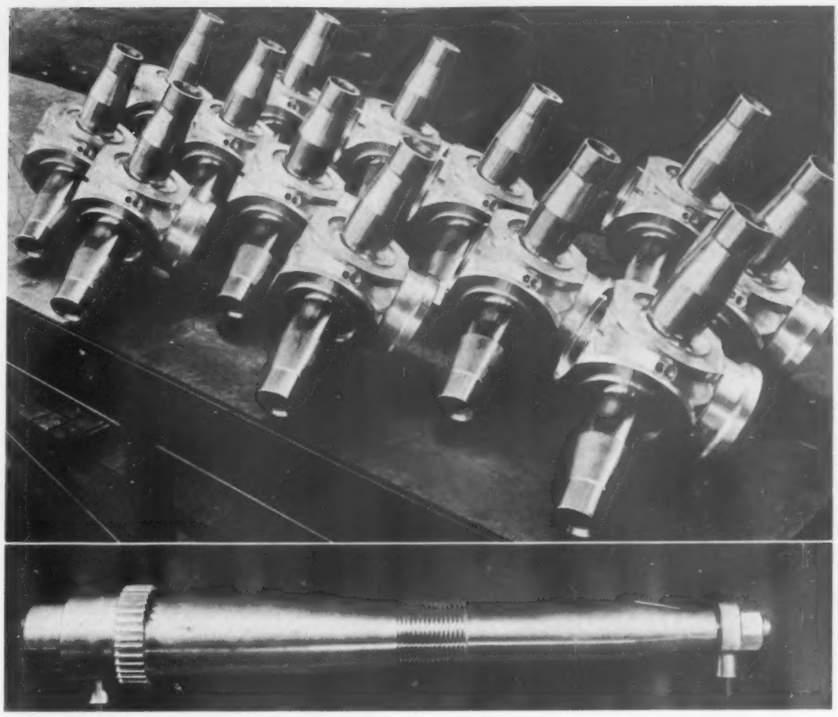
Carbon	0.35-0.45%
Manganese	0.50-0.80%
Nickel	1.50-2.00%
Chromium	0.60-0.90%
Molybdenum	0.20-0.30%

TABLE II

Mechanical Properties—SAE X-4340

Tensile Strength, p.s.i.	230,000
Yield point, p.s.i.	210,000
Reduction of area, per cent	47
Elongation, per cent in 2 inches	12
Izod impact, ft. lbs.	17
Brinell hardness	477

Fig. 1. (Upper)—Hydromatic airplane propellor spiders machined at 415 brinell. Fig. 3. (Lower)—Gear shaft completely machined from bar stock at 477 brinell

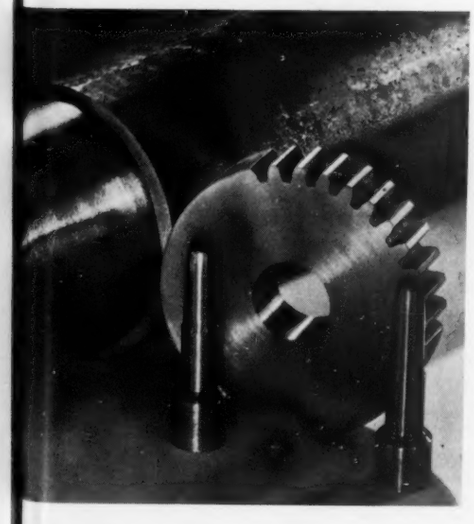


spiders machined at 415 brinell at the East Hartford plant of Hamilton Standard Propellors division of United Aircraft Corp.

Instances have been reported in which industrial gear manufacturers have developed successful commercial practice for machining gears of SAE 4340 at hardnesses as high as 500 brinell. Fig. 2 illustrates a gear blank partially machined from bar stock of Ryerson's "Nikrome M" nickel-chromium-molybdenum steel, heat treated to 477 brinell. Turning in this instance was accomplished in an ordinary lathe using a standard ⅝-inch square high-speed-steel tool with a 3/16-inch cut and a 1/32-inch feed at a speed of 18 surface feet per minute. A shaft completely machined at 477 brinell is shown in Fig. 3.

The machining at high hardness of gears and other wearing parts offers many interesting commercial possibilities. Machine tool gears, for instance, benefit by this increased hardness because they must be wear resistant to maintain the accuracy and smooth-running characteristics of the machine over a long service life. If advantage is taken of the higher strength accompanying the increased hardness, gears may be redesigned to save appreciable weight. Heavy gears such as turbine reduction gears are ordinarily produced at relatively low hardness to avoid machining difficulties. Redesign of such gears on a higher strength basis permits reduction in the face width without exceeding the safe unit tooth load and with resultant saving in weight and economy of material.

Fig. 2—Partially machined gear from nickel-chromium-molybdenum bar stock heat treated to 477 brinell. Completed shaft shown in Fig. 3



In a recent demonstration at the laboratory of the International Nickel Co., SAE X-4340 steel heat treated to 450 brinell was machined on a standard Warner & Swasey turret lathe, using conventional high-speed-steel cutting tools of the 18-4-1 type. A cutting oil containing an appreciable percentage of saponifiable oil and sulfur was employed. The machining operations were designed to illustrate a wide variety of cutting work and included chamfering, turning, drilling and form tooling. A turning cut, in which the bar was reduced in diameter from 2 to 1½ inches, was performed at a speed of 49 feet per minute with a feed of 0.0075-inch. These figures were used for demonstration purposes and are not combinations which would be useful in commercial practice. A tightly wound helical chip with no tendency to tear, check or burn resulted and a smooth surface was produced on the bar.

In addition to satisfactory machinability, this nickel alloy steel possesses high mechanical properties. The accompanying tables illustrate the good ductility and resistance to impact characteristic of SAE X-4340 at high strength levels.

♦

Lock Nut Increases Sheet Thread Area

■ A new method of increasing thread area in sheet metal, making practical the use of lighter gage metals and simplifying assembly in inaccessible places is provided by Fast-On lock nuts manufactured by Fabristeel Products Inc., Kerr Machinery building, Detroit.

In assembling, the small square portion of the nut is inserted in the hole previously cut in the metal, protruding just enough for the four corners to be clinched with a swaging tool. This locking is a positive action and the nut will not work loose, variation in the thickness of the metal being taken care of automatically. As the thread runs to the edge of the nut, it is practical to use with shorter screws and closer clearances.

Thirty-three different kinds of lock nuts are available in #6, 8, 10, 12; ¼, 5/16 and ⅜-inch sizes and various thread pitch diameters.

Discussion by Experts On Cost Accounting

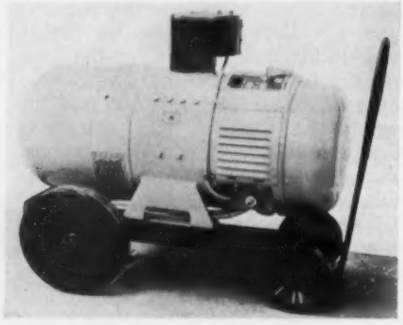
■ *National Association of Cost Accountants* 1939 *Yearbook*, 406 pages; published by National Association of Cost Accountants, New York; supplied by STEEL, Cleveland, for $3.

Issued primarily for association members, this volume is being made available for others as long as the supply lasts. These yearbooks have been issued for the past 20 years. The present volume is based on the technical sessions of the twentieth international cost conference in June, 1939.

The contained papers relate to development of industrial prices, product pricing, cost control, etc. Roundtable discussions on various subjects are also included.

Remote Control Device For Arc Welders

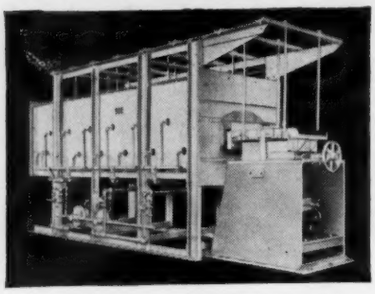
■ Wilson Welder & Metals Co. Inc., 60 East Forty-second street, New York, has introductd a new device for remote control of its Hornet arc welders. To utilize the new device, handwheel which governs the control pole of the welder is simply replaced by the reversible motor-driven type SC remote control device. Device allows minute



adjustments in current output by merely touching one of two contacts on the electrode holder to the ground. The contact buttons are shaped differently, so operator can locate the correct one easily even in poor light. The 1/80-horsepower electric motor, which operates the control pole, is protected by two limit switches and by a slip clutch. Generator may be preset by push buttons mounted on the control itself.

Hardening Machine

■ American Gas Furnace Co., Elizabeth, N. J., announces a new, larger size, reciprocating full muffle clean hardening machine for capacities of 400 to 600 pounds of work hardened per hour. Its combustion space has been increased to insure temperature uniformity and with the various means available for regulating the heating time. The time-temperature cycle can be adjusted readily to meet any requirements. Machines are furnished either with a full muffle having a ribbon flame seal at the work entering end or a special seal where the reciprocating muffle meets the stationary discharge chute. Where atmosphere control need not be so exacting, machines are supplied with an open hearth having high side ribs to eliminate possibility of work dropping off into combustion chamber. For long thin cylindrical pieces, the hearth or bottom of the muffle is grooved to insure such parts travelling with their long axis parallel with the hearth. An-



other feature of these machines is the cascade in the discharge to prevent smoke or oil fumes backing up into the muffle.

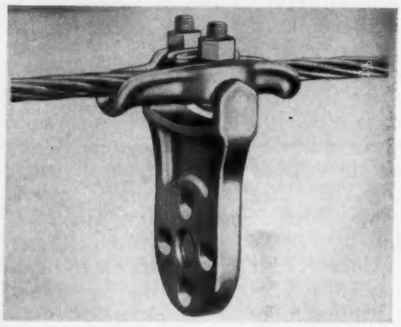
Motor Starter

■ Cutler-Hammer Inc., 315 North Twelfth street, Milwaukee, announces an improved across-the-line starter for the control and protection of polyphase squirrel cage motors up to 5 horsepower. Model now embodies simplified hook-on cover, held by one fastening screw, which can be removed for easy installation. Loosening one screw also permits

removal of operating mechanism for wiring and conduit work. The contacts, dust safe vertical type, are now of heavier "fine" silver. Lava insulators protect contact springs against minor heat transmission. Contact springs and contact supports are all of stainless steels. Other metal parts are cadmium plated. The C-H "drop of solder" overload relay has been made smaller in size with better operating characteristics. Starter is available in reset only for 2 or 3-wire remote control, start and stop reset buttons for 3-wire control and 3-position selector switch for manual-off-automatic local control or 2 or 3-wire remote control.

Ground Wire Bracket For Steel Towers

■ Ohio Brass Co., Mansfield, O., announces a ground wire bracket for steel towers. It has four holes to allow bolting to a steel tower, a fabricated steel pole or a bayonet extension. Known as Clamptop, bracket permits an increase of spacing between ground wire and conductors of 6 inches or more. Bracket proper has two pintles on which clamp body rests. Two carriage bolts hold clamp to bracket and



secure the keeper piece over the ground wire. Since clamp pivots 15 degrees above or below the neutral position, ample clearance for rocking action is provided. It holds any wire from ¼ to 9/16-inch.

Auxiliary Switch

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has placed on the market electrically operated auxiliary switch for making and breaking several circuits simultaneously such as on a differential bus protection system where several circuit breakers are tripped at once. Switch is provided with any arrangement of make and break contacts up to 10, however, by means of geared switches and parallel or series arrangement of switch coils any desired number or combination of circuits can be handled. Two operating arrangements are provided as standard. One type can be tripped from front of panel by rotating handle, as well as by energizing shunt

trip coil. Other type can be tripped only by operating mechanism behind panel. Position of handle provides visual indication of last operation of switch. Switch is spring-operated with shunt trip arrangement. Contacts are held in reset or open position against force of torsional spring by a position latch. Two independent latches and springs are used to insure positive action.

Air Circulator

■ Emerson Electric Mfg. Co., 1824 Washington avenue, St. Louis, announces a new 30-inch 2-speed air circulator which delivers a maximum of 10,000 cubic feet of air per minute and 7500 cubic feet per minute on slow speed. It is available for ceiling mounting, adjustable floor column mounting, counter column mounting and wall bracket mounting. It is equipped with blades of heavy gage aluminum.

Explosion-Proof Motors

■ U. S. Electrical Motors Inc., 200 East Slauson avenue, Los Angeles, has placed on the market higher horsepower explosion-proof motors. Ratings have been increased from 25 to 75 horsepower in class I group D, while in class II group G they have been increased from 7½ to 75 horsepower. Larger motors are of shell frame construction. They have a specially designed fan which runs quietly at high speeds. The fan-end inner end bell and the outer fan cover bracket are held in place with a combination screw. This eliminates one set of holding screws and supplies rigid and secure mounting for the fan cover and bracket as well as facilitating assembly or disassembly of motor.

Metal-Clad Switchgear

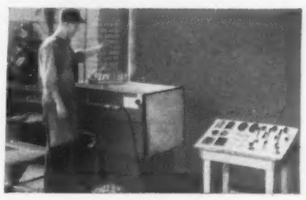
■ General Electric Co., Schenectady, N. Y., has introduced improved MI-9 metal-clad switchgear for protection of circuits up to 5000 volts and 50,000 kilovolt amperes. All buses and connections are completely insulated. A screw-jack mechanism, built into housing, raises and lowers breaker. Mechanical interlocks, removable breakers and isolated current transformers, buses and connections are retained as features. Oil blast principle of circuit interruption is employed. Primary disconnecting devices are of stud-and-socket type, with silver-to-silver, high-pressure line contacts. Stationary sockets are mounted in glazed, wet-process porcelain. Movable contacts are the oil-circuit-breaker studs. Secondary disconnecting devices connect or disconnect automatically all secondary connections when the breaker is raised or lowered in the housing. Mechanical interlocks prevent disconnecting or reconnecting breaker while it is closed.

Grinding Wheels

■ Atlantic Abrasive Corp., South Braintree, Mass., announces two grinding wheels for precision grinding involved in high speed steels and similar metals. Wheel type L.B. is for fast, clean cutting on tools or dies. It comes in all grain sizes from coarse to fine. Type S. B., also available in all grain sizes, is a medium tempered wheel for grinding fine tools of high speed steel, stellite, carboloy and other alloyed steels.

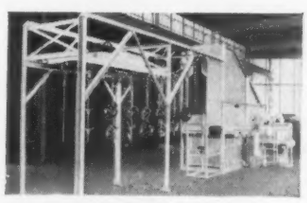
Threading Cutters

■ National Acme Co., 170 East 131st street, Cleveland, has developed a complete line of end turning, end forming, combination turning and threading cutters of the circular type for use in its standard circular chaser die heads. Because each capacity head serves both threading



Immersion Cleaning Before Plating.

Vapor Cleaning Assembled Transmission.



Conveyorized Immersion Degreaser Used On Heavy Stampings.

THE modern camera — precision built and attractively finished — requires cleaning at many points of its production. In this respect Detrex Solvent Degreasing aids manufacturers throughout the country . . . cleaning their metal products for better finishing and finer performance . . . giving them greater sales appeal!

The cleaning of metal parts before painting, plating, inspection or assembly . . . and the removing of machining, stamping and quenching oils, polishing and buffing compounds, etc. . . . are all simple jobs with a Detrex degreaser. These machines are ruggedly built for most efficient service. Stabilized safety solvents — either PERM-A-CLOR or TRIAD — are used to give you maximum economy and safety.

If you desire cleaning speed and uniformity . . . whether you make metal sporting equipment, cabinets, refrigerators, toys, tools, hardware, motors or other metal products . . . investigate DETREX. It may be the "aid-in-sales" you need.

Write today for further data or free engineering consultation.

DETROIT REX PRODUCTS CO.

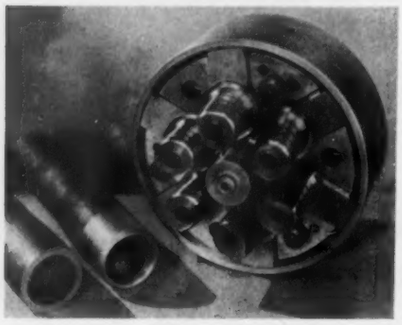
Degreasers, Solvents, Washers and Alkalies

13029 HILLVIEW AVENUE • • DETROIT, MICHIGAN

Branch Offices in Principal Cities in U. S. A.

In Canada: Canadian Hanson & VanWinkle Co., Ltd., Toronto, Ont.

and hollow milling jobs, it is designated as a Double Duty head. Standard heads equipped for hollow milling have the same construction as for threading. Change from threading to hollow milling or vice versa, requires only a change of holding blocks and cutters in the same head.



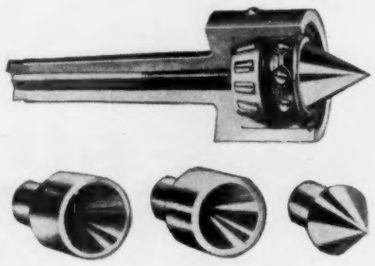
The end cutters, like chasers, are adjustable for diameters. The hollow mill cutters are of the circular form tool type. These heads are supplied for both revolving and nonrevolving spindle machines for standard and special applications in sizes of ¼ to 13⅜ inches.

Portable Potentiometer

■ J-B-T Instruments Inc., New Haven, Conn., announces a new type of portable potentiometer for measurement of temperatures by thermocouples. Model 70-PO, as it is known, also is designed for testing permanently installed temperature measuring and controlling equipment. It is light in weight and withstands vibration and adverse conditions of ambient temperature. Its circuit, for which patent has been applied, requires only a flashlight cell. Guaranteed accuracy is ½ of 1 per cent total scale deflection and the 6¾-inch temperature scale may range from minus 50 to plus 50 degrees Fahr. up to 0-3000 degrees Fahr. Knife-edge pointer with mirror scale to avoid parallax is optional; double-scale instrument is available also. Instrument is independent of thermocouple resistance (within large limits), permitting small thermocouples to be used. With scales of 0-400 degrees Fahr. and higher, once balanced and adjusted, Model 70-PO requires no further balancing operation, but is thereafter read as a deflection instrument. On scales below 0-400 degrees Fahr. but one balancing operation is needed for each temperature reading. Instrument case is mahogany and is equipped with leather carrying handle.

Live Center

■ Ideal Commutator Dresser Co., Sycamore, Ill., announces a live center with interchangeable inserts or center pieces for holding centered and uncentered work. Three inserts are available—male, for work already centered; plain, for uncentered work, and female, with three raised lands for uncentered work having a flat or burred keyway. All are removed quickly by knockout screw. Short overhang eliminates chatter. All cuttings, oil, dirt and chips are kept out by sealed ball bearings. Live center is adaptable to a variety of machine tools, such as lathes, millers, grinders and hard screw machines.

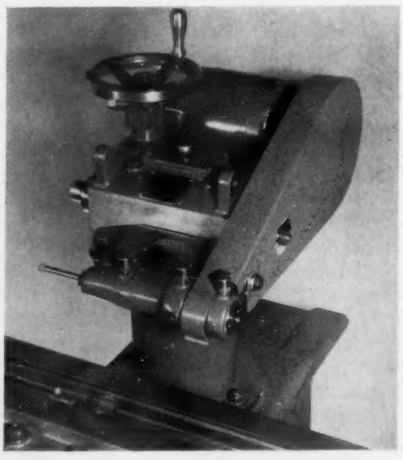


Milling Machine

■ Cincinnati Milling Machine Co., Oakley, Cincinnati, has placed on the market its line of plain, universal and vertical dial milling machines for rapid metal removal. They are built in three sizes, Nos. 2, 3 and 4, and 2-speed feed ranges. Speeds and feeds are controlled by a single lever. Each machine does the work of shifting gears, and feeds are changed in the same manner. All power control and hand adjustment levers are grouped at the front operating position. Power feed controls at the front of the knee have been rearranged to provide greater convenience of operation. Both cross and vertical power controls are near the top of the knee. Power longitudinal, cross and vertical feeds are engaged by independent feed levers. The column of Meehanite is heavier, wider at the base and at the overarm. A new hydraulic device has been incorporated with the spindle drive starting lever. Connected with the link mechanism, a hydraulic Servo control takes over the work of engaging the clutch. This permits spindle to be inched along. Micrometer dials have been redesigned to provide greater convenience. A safety feature of major importance is the motor cut-out switch at the rear of the machine.

Grinding Attachment

■ Brown & Sharpe Mfg. Co., Providence, R. I., has introduced an internal grinding attachment for its No. 10 cutter and tool grinding machine. It is used in conjunction with the revolving spindle headstock and permits precision grinding of holes up to 2½ inches in length and of ½-inch minimum diameter in work of 6¾ inches maximum swing.



Spindle runs at 22,500 revolutions per minute and takes wheels of ½-inch diameter ¼-inch thick and 3/32-inch hole. A long adjustable phos-

(*Please turn to Page* 80)

Handling in Press Work

(*Concluded from Page* 68)

outside of the press. This chute carries them to the stacker unit previously described. Because of the large size of these laminations, removing them by hand does not represent the hazard involved with the smaller sizes. Naturally it is slower and it would be desirable to utilize a press of sufficient size to permit handling all of the sections automatically on the conveyors.

Throughout the entire new stator production line, roller conveyors are utilized for connecting the operations from blanking through notching, separating of rotor and stator laminations and assembly of the latter into complete stators. As a result, very little storage space is required because the work, which starts with varnishing and baking of the sheets in a conveyorized oven, flows continuously along conveyor lines throughout the entire cycle of machine operations.

Installation Doubled Output

As a typical example of what conveyors and proper arrangements of handling will do to increase press output, the arrangement at this separating press furnishes an excellent study as this application of modern handling methods actually doubled the output from the unit. This important increase in production has been due largely to the automatic handling equipment allowing the press operator to run his machine continuously instead of having to trip the clutch for each individual lamination as was necessary before the handling was modernized.

Also extremely important is the increased confidence the equipment gives the operator who knows now that the previous hazard has been removed completely from the operation.

Stacking and weighing of the laminations now is done while the press is operating. Modernizing of handling operations at this point has entirely eliminated a certain amount of spoilage of laminations formerly caused by their becoming tangled in the tote pan into which they were dumped. With continuous conveyors and stacking equipment, there is little opportunity for tangles to occur.

This equipment also has afforded a most significant saving in time required for stacking and weighing the laminations. Previously it required almost twice the time to separate the rotor and stator laminations and to line them up and weigh the latter as it did to "separate" them on the press. Now they are separated and stacked automatically so operator need only weigh them which can easily be done while the press is in full operation.

While this one example shows the advantages which can be obtained by giving special consideration to handling work in one particular press operation, the same or similar features without doubt could be incorporated in a multitude of other blanking stamping and forming operations to equal advantage. In many press shops, work is more or less on a job basis where portable power-driven conveyors and stacking units would be of advantage as they would permit quick rearrangement of production lines to accommodate any sequence of press operations that might be indicated by character of the particular job at hand. Thus important savings in handling costs could be made in addition to permitting press operations to be synchronized for higher production rates. Thus if a certain job requires only two press operations instead of three or four and if all the presses were in line, those units not needed could be bypassed by a portable conveyor setup without necessity of stacking and rehandling the work at each press.

A hoist and the track on which it travels are partners for your profit. One should fit the other. That does not mean both must be made by the same manufacturer any more than an automobile tire must be made by an automobile manufacturer.
The Lo-Hed Hoist is built to run on standard I-beams or, with very slight modifications, on any track system. We make neither I-beams nor track systems. We believe that your ability to buy a hoist independent of the track is an advantage in shopping, in making track changes, or in switching the hoist location.

Get this time-tested advantage. While you're about it, look into all the other time-tested features of the Lo-Hed illustrated in the open-view of the Lo-Hed Hoist on this page: Heavy duty hoist type motor, automatic lowering brake, anti-friction bearings, stub tooth spur gears, plow-steel cable, 100% positive automatic upper limit stop, dust and moisture-proof controller. (Construction varies slightly for classes of Lo-Heds.) Investigate Lo-Hed time-tested construction. Write today for the complete Lo-Hed Catalog, using the convenient coupon shown below.

AMERICAN ENGINEERING COMPANY

2484 ARAMINGO AVENUE,
PHILADELPHIA, PA.

OTHER A-E-CO PRODUCTS: TAYLOR STOKERS, MARINE DECK AUXILIARIES, HELE-SHAW FLUID POWER

Look in your classified telephone directory under "A-E-CO LO-HED HOISTS" for your nearest representative.

MAIL THIS COUPON NOW

AMERICAN ENGINEERING COMPANY
2484 Aramingo Avenue, Philadelphia

☐ Please send me your 26 page complete catalog of Lo-Hed Hoists.
☐ Ask your representative to call.

Name _____
Company _____
Street Address _____
City _____ State _____
(Please print plainly)

New Equipment

(*Concluded from Page* 78)

phor bronze bearing supports spindle at the wheel end and two double-row self-aligning ball bearings at the pulley end take the pull of the belt. The spindle is carried in a casting which is clamped by two bolts to the finished face of the machine column. Drive is by endless belt from a pulley mounted on the wheel motor shaft. Attachment also includes a height gage.

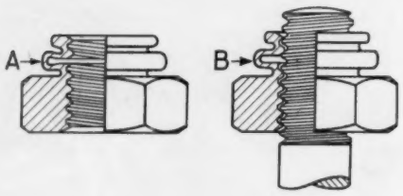
Hydraulic Presses

■ Farrel-Birmingham Co. Inc., Ansonia, Conn., has introduced a 20 x 20-inch hydraulic press for molding

small rubber and plastic articles. The housing, which includes the top, bottom and sides, is a single casting. Meehanite cylinder and gland are lined with bronze and gland studs. The nuts are stainless steel. Press is designed to operate at an initial water pressure of 2000 pounds per square inch, giving a total pressure of 113 tons or 563 pounds per square inch on the platens. It is equipped with three 20-inch square plates to provide a smooth finish and drilled to permit maximum steam circulation and uniform heating. Steam connections for platens are flexible tubing and are fully enclosed in the housing. Temperature of platens is controlled automatically by an air-operated diaphragm valve.

Self-Locking Nuts

■ Scovill Mfg. Co., Waterbury, Conn., has introduced the Boots self-locking nut to withstand severe vibration. It is essentially two nuts in one, with top section displaced in a downward direction so that its upper (locking) threads are out of lead with respect to the load-carrying threads of the lower section. The two sections are connected by a spring member which is an integral part of the nut. Upon insertion of a bolt, the spring member allows the top section of the nut to be extended to permit it to engage properly with threads of the bolt. In the sketches, A shows the Boots self-locking nut spring member in its displaced position when not engaged with a screw or bolt. Position of the spring member when nut is engaged is shown in B. Both sketches are exaggerated to show the principle involved. At present nuts are available in sizes from No. 8 to ¾-inch inclusive, in a variety of metals.



Small Motor Switches

■ McGill Mfg. Co., Valparaiso, Ind., announces an improved Levolier switch for fan assemblers and manufacturers of small motors with circuit control. This type of switch is not limited to one control. Other variations can be arranged.

♦

Electric Welded Chain

(*Concluded from Page* 73)

If these or any other defects are found, the link is cut out and a new link welded in place.

Next the chain is fed through a continuous heat-treating furnace where its strength is raised and weld stresses relieved.

After heat treatment, chain is tumbled in stones and chips. Then it is polished by tumbling in sawdust.

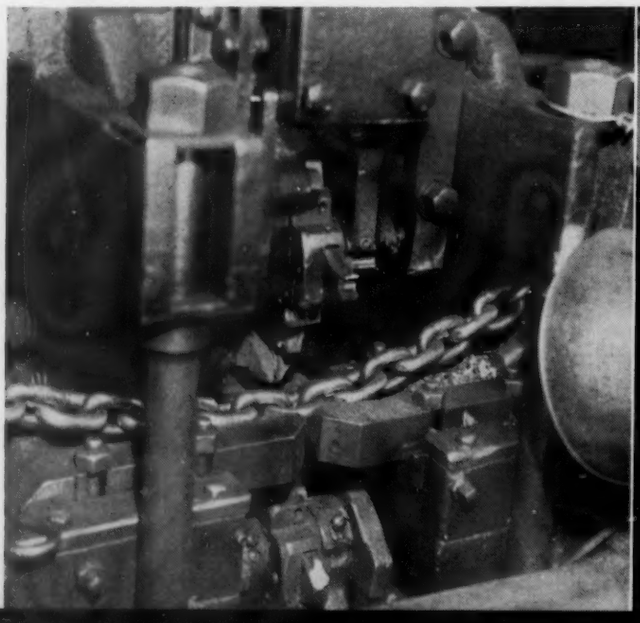
Next comes a rather unusual operation to anyone not acquainted with chain manufacture. The chain actually is stretched 1 inch to every 3 feet.

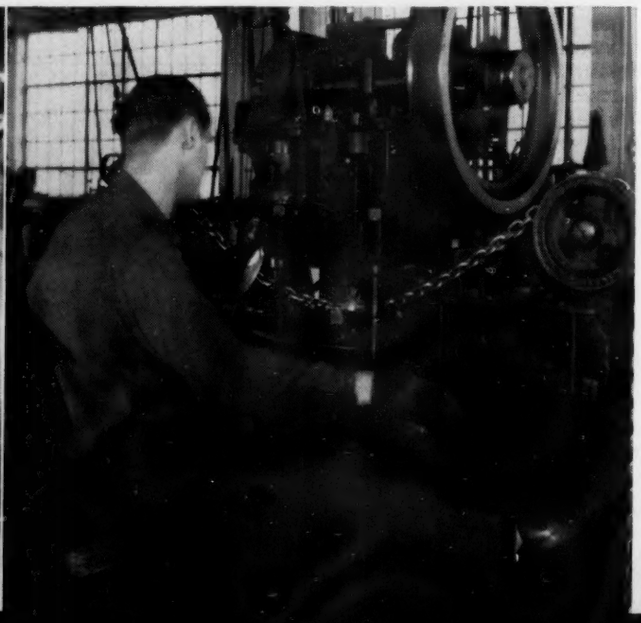
This stretching sets up the elastic limit and cuts down stretch when in use. The work is done in a special machine utilizing a toothed cam drive and arranged with exact measuring device to indicate when the desired elongation has occurred.

Result of the careful processing described above is a chain that can be relied upon to carry its rated load safely and to give full measure of service.

Fig. 7. (Left)—Closeup of welding machine to show welding contacts, forging hammers above and below link, movable dies for compressing link to force out excess metal as weld is made

Fig. 8. (Right)—Showing operator and some of the controls he manipulates





< < < HELPFUL LITERATURE > > >

(1)—Mobile Derrick

American Hoist & Derrick Co.—4 page illustrated bulletin No. 400-R-2, describing the "American Revolver," a broad-gage, full revolving, all steel live boom traveler which combines the stability and capacity of the derrick with the mobility of the locomotive crane.

(2)—Nickel Alloys

International Nickel Co.—16 page illustrated booklet "Seven Minutes with Seven Metals" is a general guide to uses and properties of nickel and high nickel alloys such as nickel, Monel, Iconel, and associated alloys. Includes detailed tables of mechanical, chemical, and physical properties.

(3)—Industrial Capacitors

General Electric Co.—24 page illustrated bulletin No. GEA-2742A. Presents data on "Pyranol" capacitors for low-voltage industrial applications on 230, 460, and 575-volt circuits. Describes power factor improvement for profit and shows available equipment.

(4)—Materials Handling

Lewis-Shepard Sales Corp. 56 page illustrated catalog No. 21, describing entire line of materials handling equipment. Specifications are given on floor, hand, and lift trucks; skid platforms; stackers and cranes; storage racks; and wheels.

(5)—Tube Fabricators

Parker Appliance Co.—36 page illustrated bulletin No. 40E, containing description of benders and tube fabricating equipment. Includes complete instructions on use of equipment and list prices. Gives data on accessories.

(6)—Hydraulic Cylinders

Hannifin Manufacturing Co.—20 page illustrated bulletin No. 35-B, presenting full details on series N hydraulic cylinders, and improved type of high pressure units of simplified design for all classes of hydraulic power applications.

(7)—Diamond Wheels

Carborundum Co.—8 page illustrated folder No. A-975, presenting description, application and engineering data on the new metal bonded diamond wheel for sharpening and conditioning of cemented carbide tools.

(8)—Carburizing

Surface Combustion Corp.—4 page illustrated bulletin No. SC-91 presents actual operating data and costs of carburizing with the "Eutectrol" process, in continuous and batch furnaces. Describes advantages of system.

(9)—Silent Fans

B. F. Sturtevant Co.—24 page illustrated catalog No. 451, gives general description of "Silentvane" design 7 fans, which have slow rotative speeds, quiet operation, self limiting horsepower characteristic, and freedom from dust loading. Shows vane control, standard arrangements, designations, weights, high temperature and oven designs, and specifications.

(10)—Turret Lathes

Gisholt Machine Co.—98 page performance data in ring binder, covering efficient use of turret lathes, special tools and their application, how production can be increased and other valuable suggestions. Prepared for superintendents, foremen, production managers and tool engineers in metal working field. Additional data sheets are sent each month.

(11)—Cooling Controls

Sarco Co.—8 page illustrated bulletin No. 197, illustrates and describes recirculating, throttling, and refrigeration controls for brine coolers, engines, compressors, condensers, degreasers, cold storage, air conditioning, and drinking. Engineering data, piping layouts, and equipment details and prices are given.

(12)—Electrical Instruments

Leeds & Northrup Co.—66 page illustrated catalog No. E, lists and describes briefly entire line of instruments for research and routine testing in laboratory, plant and field including standards, galvanometers and dynamometers, bridges, potentiometers, accessories and miscellaneous apparatus.

(13)—Bearings

Fafnir Bearing Co.—130 page illustrated catalog No. 35X is handy data book containing dimensions, diagrams, load ratings, types and sizes of bearings in complete line of radial, thrust, precision, self-aligning and sealed bearings and housed transmission units.

(14)—Brazed Tip Tools

Fansteel Metallurgical Corp.—8 page illustrated bulletin No. G-402, contains description, data, prices and production uses of "Tantung" brazed tip tools for cutting steel at high operating speeds. Gives information on how to order and lists available standard tools and tips.

(15)—Needle Bearings

Torrington Co.—16 page illustrated catalog No. 21. Gives pertinent engineering information on needle bearings. Load capacity table, installation pointers and complete specifications and tolerances are included.

(16)—Industrial Supplies

Williams & Co.—278 page illustrated spiral bound combined stock list and catalog No. 400, gives list prices and data on products under headings of "Alcoa" aluminum, brass and bronze, copper, Monel and rolled nickel, nickel alloys and foundry supplies, boiler tubes, welding rods and equipment, safety supplies, and refrigeration and air conditioning supplies.

(17)—Small Electric Hoist

Detroit Hoist & Machine Co.—4 page illustrated bulletin No. 725, describes the new "Titan" electric hoist in capacities of 250, 500, and 750 pounds, with hoisting speeds up to 60 feet per minute. Illustrates types for hook, lug, or 4-wheel trolley suspension, and for lamp socket "plug-in" or power circuit operation.

(18)—Gear Motors

Reliance Electric & Engineering Co.—Illustrated bulletin No. 403, describes single-reduction type S "Gearmotors" for direct and alternating current application. Gives features and shows cross-section of unit for use in reduction ratios up to 6 to 1 inclusive.

(19)—Combustion Control

Republic Flow Meters Co.—90 page, ring bound illustrated data book No. S-21, describing "Republic-Smoot" automatic combustion control system as applied to all sizes of boilers and all types of fuel firing equipment. Discusses basic problems in boiler operation and evaluates importance in steam generation.

(20)—Oil-Retaining Bearings

Bound Brook Oil-Less Bearing Co.—8-page die list presenting inside and outside diameters of dies available for making Compo oil-retaining porous bronze bearings of sleeve type. Flanged, thrust, self-aligning and special bearings are available.

(21)—Air Cleaner

Logan Engineering Co.—4 page illustrated bulletin No. 340, explains in detail the operation of the "Aridifier" which removes moisture, oil, dirt and fine scale from compressed air and gas by centrifugal force. Application and installation details are given on all sizes from ⅝ to 10 inches.

(22)—Limit Switches

Micro Switch Corp.—4 page illustrated data sheet No. 8, describing type LK interchangeable precision limit switches which incorporate a strong roller actuator. Gives design details and full mechanical specifications of this compact unit.

STEEL
Readers' Service Dept.
1213 West Third St.,
Cleveland, Ohio

F
5-27-40

Send me the literature I have circled below.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30		
31	32	33	34	35	36	37	38	39	40	41	42	43			

Name_____

Company_____ Title_____

Address_____

City_____ State_____

This card must be completely filled out.

FIRST CLASS
PERMIT NO. 36
(Sec. 510 P. L. & R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

2c POSTAGE WILL BE PAID BY—

STEEL
Penton Building
CLEVELAND, OHIO

Readers' Service Dept.

HELPFUL LITERATURE

(Continued)

(23)—Small Steel Valves

Crane Co.—12 page illustrated bulletin No. AD-1420, describing a complete line of "tailor-made" small forged and cast steel valves for pressures up to 600 pounds and temperatures to 1000 degrees F. Included are dimensions and specifications of wedge gate, vertical ball check, globe and angle valves, horizontal check valves for fluid, water, steam, gas, oil or air.

(24)—Roller Bearings

American Roller Bearing Co.—132 page loose-leaf, embossed leatherette ring bound illustrated catalog, fully indexed, covering industrial roller bearings. Industrial applications; lubrication; medium, heavy and super-heavy duty bearings; tolerances and resultant fits; and radial bearings are included. Design, engineering, and application data given.

(25)—Fluorescent Luminaires

Westinghouse Electric & Manufacturing Co.—Illustrated booklet No. 61-152, describes "RLM" fluorescent lamp luminaires with porcelain enameled reflectors. Gives details, data and typical spread distribution curves of this unit for general or supplementary lighting in low bay industrial areas.

(26)—Dust Control

American Air Filter Co.—16 page illustrated bulletin No. 270. Describes "Roto-Clone" dust control for elimination of process dust hazards in industry. Discusses and illustrates applications for metal grinding operations, metal working, foundry shakeout and sand conditioning, abrasive cleaning, tumbling, and for kilns and boilers.

(27)—Portable Electric Heater

Electric Air Heater Co., Div. American Foundry Equipment Co.—Illustrated bulletin No. 15 describing "Electromode," heavy-duty portable electric heaters, ranging from 1 to 9 kilowatt output. Heating element in combination with integral fan heats and circulates air where needed.

(28)—Bronze Bearings

Bunting Brass & Bronze Co.—64 page illustrated catalog No. 40, lists and describes standardized industrial cast bronze, sleeve type bearings, electric motor bearings, graphited oil-less bearings, precision bronze bars, and babbitt metals. Presents specifications and dimensions of entire line available from stock.

(29)—Air Circulators

Emerson Electric Manufacturing Co.—8 page illustrated catalog No. X3658, presenting construction features, performance data and prices on 3 and 4-blade air circulators with ceiling, wall bracket, counter-column, or adjustable floor column mountings.

(30)—Boiler and Tank Parts

Steel Improvement & Forge Co.—40 page illustrated catalog No. 10, gives complete data on sizes, shapes, working pressures, dimensions, and compliance with and approval by various boiler codes of the "Diamond-S" line of drop forged boiler and tank accessories.

(31)—Fire Brick

A. P. Greene Fire Brick Co.—4 page illustrated bulletin No. P-29, describing high heat duty "Empire" fire brick for general boiler and furnace work. These bricks are made in two textures, one by the dry process and one by the stiff mud method, in standard and special shapes.

(32)—Cross-Drum Boiler

Babcock & Wilcox Co.—16 page illustrated bulletin No. G-28 presents complete information and design features of the design 32 cross-drum boiler, a sectional-header unit of moderate cost, for pressures of 250 pounds or less; and with heating surfaces from 1000 to 6000 square feet. Discusses design features.

(33)—Welding Electrodes

Darwin & Milner, Inc.—6 page folder No. 111-40, presenting information on arc welding rods for regular and special work. Such electrodes as "Cobaltcrom PRK-HT" for press tools, "PRK-SH" for hardened tool and die steels, "Darwin-C.L. No. 1" and others for special applications are described.

(34)—Hydraulic Drives

Hydro-Power Systems, Inc.—4 page illustrated bulletin No. 1-1, describing "Hydro-Power," a new operating principle for electric furnaces. Shows application of hydraulically actuated roof mechanism carrying entire electrode operating assembly. Cross-section of radial pump is shown.

(35)—Oven and Dryers

Gehnrich Corp.—32 page illustrated catalog No. 107, describes ovens and dryers for all types of industrial heating processes. Covers design and construction features, and application data, on hand, car, truck, skid rail, and conveyor loading ovens for baking, heat treating, curing, and drying.

(36)—Hob Sharpener

Barber-Colman Co.—4 page illustrated bulletin No. F-1011-2, describing the No. 4 automatic hob sharpening machine for sharpening straight or helical gashed hobs and formed cutters up to 10-inch diameters. Machine grinds radial face on either straight or helical gashes. Lists features of unit.

(37)—Controller

Foxboro Co.—8 page illustrated bulletin No. 240, fully explains mechanism and operating characteristics of the potentiometer indicating recording controller for precise control of industrial processes. Describes electric two-position, electric throttling, and air-operated throttling mechanisms.

(38)—Steel Shafts

Bissett Steel Co.—4 page stock list of "Cumberland" turned and ground steel shafts. Gives dimensions, and specifications of special and standard ground bars and forged shafts supplied in either annealed or heat treated condition; also alloy bars and stainless or rustless shafts.

(39)—Steel Split Pulleys

American Pulley Co.—12 page illustrated catalog No. P-39. Contains list prices and dimensional details of complete line of "American" steel split pulleys, interchangeable split type bushings, special pulleys, conveyor pulleys, and ball bearing loose pulleys.

(40)—Shell Forging Presses

Baldwin Southwark Div., Baldwin Locomotive Works—4 page illustrated bulletin No. 110, describes mechanical details and gives production data on "Baldwin-Omes" shell forging presses for manufacture of artillery shells and similar forgings.

(41)—Pipe Tools

Beaver Pipe Tools—24 page illustrated catalog No. 40. Hand and machine operated pipe tools of all types are described. Design and application data on pipe and bolt threaders, pipe cutters, adjustable threaders, pipe and bolt machines, and dies are presented.

(42)—Brake and Flanging Unit

Beatty Machine & Manufacturing Co.—8 page illustrated bulletin No. 300. Gives complete data on 300-ton hydraulic press brake and ¾-inch flanging machine for flanging, V-bending, forming, pressing and straightening.

(43)—V-Belt Drives

Medart Co.—Illustrated bulletin No. 88-M, shows belt ratings of Medart V-belts to aid in selection of drives. Simple methods of calculating correct belt and sheave combinations are given. Arithmetic is all that is needed to determine combination for any drive problem.

STEEL
Readers' Service Dept.
1213 West Third St.,
Cleveland, Ohio

F
5-27-40

Send me the literature I have circled below.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30		
31	32	33	34	35	36	37	38	39	40	41	42	43			

Name_____

Company_____ **Title**_____

Address_____

City_____ **State**_____

This card must be completely filled out.

FIRST CLASS
PERMIT No. 36
(Sec. 510 P.L. & R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

2c POSTAGE WILL BE PAID BY—

STEEL
Penton Building
CLEVELAND, OHIO

Readers' Service Dept.

Steel Buying, Output Expand More Rapidly

Domestic users extend forward coverage as war continues to influence markets. Pig iron sales spurt. Scrap up further

MARKET IN TABLOID ★

Demand
Heavier for most products; exports active.

Prices
Firmer; scrap highest in more than five months.

Production
Up 5 points to 75 per cent.

■ WAR influence continues to dominate iron and steel markets, stimulating foreign and domestic demand.

While domestic buying is predicated largely on current and future requirements, the prospect of deferred mill deliveries is encouraging consumers to be more liberal in specifying against previous orders and in adding to inventories. Bookings this month will be sharply higher than in April.

Possibility of delayed shipments has been strengthened by the rapid upturn in steelworks operations. Ingot production jumped 5 points to 75 per cent last week but has yet to reach a peak, further improvement being scheduled for this week. Output a year ago was 48 per cent.

While the expansion in steelmaking is comparable to that of last September, domestic demand lately has been more restrained than at the time of the war's outbreak. However, foreign buying has been heavier than last fall, and mills are pushing operations in anticipation of sustained or more active needs of both the Allies and neutrals, as well as a prospective increase in consumption at home for defense purposes. Steel requirements in the preparedness program still are indefinite and it is thought doubtful if these measures will have a marked effect on steel demand for several months.

Export inquiry continues heavy, principally from the Allies but including an impressive total from neutrals. Purchases last week included approximately 70,000 tons of shell steel for England and France.

Pig iron buying has increased sharply, stimulated by the general upturn in metalworking activity and by the fact foundries had taken delivery against most of old contracts and have had only moderate stocks lately. Third quarter pig iron inquiry is more active.

Scrap markets continue buoyant, with the price composite advancing 59 cents last week to $18.21. This is the highest since the first week of last December. A strong tone is maintained in the face of relatively light mill demand for steelmaking grades.

Building activity still is headed by industrial and residential work, both of which are in better volume than a year ago. The lag in public construction is a retarding factor, however. In some districts structural fabricators are rushed with inquiries for small jobs, principally plant additions. War developments are responsible for only a relatively minor part of such activity. Recent steel awards include 3000 tons of pipe piling for a Hartford, Conn., office building, 2000 tons of shapes for a Wilmington, Del., office building and 1500 tons of reinforcing bars for a Camden, N. J., factory addition.

Prospects for a revival in freight car building and repair work are improved by the indicated upturn in industrial activity, although few large inquiries currently are active. Terminal Railroad Association of St. Louis has bought ten diesel-electric switching locomotives, the Burlington has placed nine diesel units and the Western Maryland is in the market for 12 steam locomotives.

For the second time since 1929 almost all Great Lakes bulk freighters are in operation, the result of the pressure to quicken ore and coal shipments. Stocks of Lake Superior iron ore at blast furnaces and Lake Erie ports on May 1 were nearly 21 per cent smaller than a year ago.

Automobile production is settling more rapidly but is considerably steadier than a year ago. In fact, no previous year has matched the stability of assemblies since January. Output last week was 96,810 units, a decrease of 2220 from the week before but comparing with 67,740 units a year ago.

Tin plate shares in the rise in steel demand, with production up 3 points last week to 71 per cent. Sheet and strip output is being quickened by heavier releases in anticipation of a cessation of shipments June 30 against low-price orders. With mill schedules becoming crowded, producers find it less difficult to drive in specifications for such tonnage.

Pittsburgh and Chicago furnished most of the latest gain in steelmaking, the former's rate soaring 8½ points to 73½ per cent. Chicago was up 5 points to 75. Other gains were 7 points to 67 in eastern Pennsylvania, 3 points to 57 at Youngstown, 6 points to 78 at Cleveland, 11½ points to 65 at Buffalo and 7½ points to 55 at St. Louis. Detroit was down 1 point to 79 and Wheeling slipped 3 points to 85. Unchanged were New England at 56, Cincinnati at 61 and Birmingham at 83. Operations in several districts exceeded estimates made at the opening of last week.

COMPOSITE MARKET AVERAGES

	May 25	May 18	May 11	One Month Ago Apr., 1940	Three Months Ago Feb., 1940	One Year Ago May, 1939	Five Years Ago May, 1935
Iron and Steel	$37.51	$37.40	$37.25	$36.69	$37.21	$35.80	$32.35
Finished Steel	56.60	56.60	56.60	55.90	56.50	56.00	54.00
Steelworks Scrap..	18.21	17.62	16.83	16.00	16.98	14.05	10.27

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week: Average for Last Month, Three Months and One Year Ago

Finished Material

	May 25, 1940	April 1940	Feb. 1940	May 1939
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.20c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.52
Iron bars, Chicago	2.25	2.25	2.30	2.10
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.00	2.10	2.05
Sheets, cold-rolled, Pittsburgh	3.05	2.95	3.05	3.10
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	1.95	2.10	2.03
Sheets, cold-rolled, Gary	3.05	2.90	3.05	3.08
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.45

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	2.00	2.00	2.00	1.92

Pig Iron

	May 25, 1940	April 1940	Feb. 1940	May 1939
Bessemer, del. Pittsburgh	$24.34	$24.34	$24.34	$22.34
Basic, Valley	22.50	22.50	22.50	20.50
Basic, eastern, del. Philadelphia	24.34	24.34	24.34	22.34
No. 2 foundry, Pittsburgh	24.21	24.21	24.21	22.21
No. 2 foundry, Chicago	23.00	23.00	23.00	21.00
Southern No. 2, Birmingham	19.38	19.38	19.38	17.38
Southern No. 2, del. Cincinnati	22.89	22.89	22.89	20.89
No. 2X, del. Phila. (differ av.)	25.215	25.215	25.215	23.215
Malleable, Valley	23.00	23.00	23.00	21.00
Malleable, Chicago	23.00	23.00	23.00	21.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	28.34
Gray forge, del. Pittsburgh	23.17	23.17	23.17	21.17
Ferromanganese, del. Pittsburgh	105.33	105.33	105.33	85.33

Scrap

Heavy melt. steel, Pitts.	$19.25	$16.45	$17.75	$14.55
Heavy melt. steel No. 2, E. Pa.	17.00	15.50	16.30	12.75
Heavy melting steel, Chicago	17.25	15.20	15.75	12.75
Rails for rolling, Chicago	21.25	18.65	18.25	17.25
Railroad steel specialties, Chicago	20.25	18.05	18.50	14.75

Coke

Connellsville, furnace, ovens	$4.75	$ 4.75	$ 4.75	$ 3.75
Connellsville, foundry, ovens	5.75	5.75	5.75	5.00
Chicago, by-product fdry., del.	11.25	11.25	11.25	10.50

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast ports	2.65c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast ports	3.70c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast ports	4.05c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.55c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.40c	4.00c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30 50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	24.00	35.00
Cold stp.	22.00	22.50	32.00	52.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.46c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	4.00c

Structural Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast ports	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.05c
Chicago or Gary	2.05c
Detroit, delivered	2.15c
Cleveland	2.05c

Buffalo	2.05c
Birmingham	2.05c
Gulf ports	2.40c
Pacific Coast ports	2.70c

Iron

Chicago	2.25c
Philadelphia, del.	2.37c
Pittsburgh, refined	3.50-8.00c
Terre Haute, Ind.	2.15c

Reinforcing

New Billet Bars, Base

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	1.60-1.90c
Gulf ports	1.95-2.25c
Pacific Coast ports	2.00-2.30c

Rail Steel Bars, Base

Pittsburgh, Gary Chicago, Buffalo, Cleveland, Birm.	1.60-1.90c
Gulf ports	1.95-2.25c
Pacific Coast ports	2.00-2.30c

The above represent average going prices. Last quotations announced by producers were 2.15c, mill base, for billet bars and 2.00c for rail steel.

Wire Products

Pitts-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails	$2.55
(Per pound)	
Polished fence staples	2.55c
Annealed fence wire	3.05c
Galv. fence wire	3.40c
Woven wire fencing (base C. L. column)	67
Single loop bale ties, (base C.L. column)	56
Galv. barbed wire, 80-rod spools, base column	70
Twisted barbless wire, column	70

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg $3.85

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

* Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.70c

Detroit, delivered 2.80c

Alloy	Diff.	Alloy	Diff.
S.A.E.		S.A.E.	
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20
4100 0.15 to 0.25 Mo.			0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.			1.10
5100 0.80-1.10 Cr.			0.45
5100 Cr. spring flats			0.15
6100 bars			1.20
6100 spring flats			0.85
Cr. N., Van.			1.50
Carbon Van.			0.85
9200 spring flats			0.15
9200 spring rounds, squares			0.40

Electric furnace up 50 cents.

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast ports	2.75c
Cooperage hoop, Young., Pitts.; Chicago, Birm.	2.20c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve., Pitts.
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

⅛ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts separate 72.5 off; with nuts attached add 15%; bulk 83.5 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less	67	70
⅝-1-inch	64	65
1⅛-1½-inch	62	62
1⅝ and larger	60	..

Hexagon Cap Screws

Upset, 1-in., smaller	70.0 off

Square Head Set Screws

Upset, 1-in., smaller	75.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.85c
Pacific Coast ports	2.95c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural	3.40c
7/16-inch and under	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75	off

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1⅛ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63⅛	54
¼	66⅛	58
⅜—⅜	68⅛	60⅛

Iron

⅛	30	13
¼—⅜	34	19
½	38	21⅛
¾—2	37⅛	21

Lap Weld

Steel

2	61	52⅛
2½—3	64	55⅛
3½—6	66	57⅛
7 and 8	65	55⅛
9 and 10	64⅛	55
11 and 12	63⅛	54

Iron

2	30⅛	15
2½—3½	31⅛	17⅛
4	33⅛	21
4½—8	32⅛	20
9—12	28⅛	15

Line Pipe

Steel

1 to 3, butt weld	67⅛
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63⅛
12-inch, lap weld	62⅛

Iron

	Blk.	Galv.
⅜ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15⅛
2 butt weld	32⅛	15
1½ lap weld	23⅛	7
2 lap weld	25⅛	9
2½ to 3½ lap weld	26⅛	11⅛
4 lap weld	28⅛	15
4½ to 8 lap weld	27⅛	14
9 to 12 lap weld	23⅛	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½ "O.D.	13	$ 9.72	$23.71
1¾ "O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼ "O.D.	13	13.79	21.68
2¼ "O.D.	12	15.16	....
2½ "O.D.	12	16.58	26.57
2¾ "O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½ "O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1 "O.D.	13	$ 7.82	$ 9.01
1¼ "O.D.	13	9.26	10.67
1½ "O.D.	13	10.23	11.79
1¾ "O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼ "O.D.	13	14.54	16.76
2¼ "O.D.	12	16.01	18.45
2½ "O.D.	12	17.54	20.21
2¾ "O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½ "O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½ "O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl. (per 100 lbs.) $2.00
Do., over ⅝ to 41/64-in. incl. 2.15
Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.50.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.35- 4.60
Connellsville, fdry.	5.00- 5.75
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.25- 6.50
Wise county fdry	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.38-11.85
Chicago, outside del.	10.50
Chicago, delivered	11.25
Terre Haute, del.	10.75
Milwaukee, ovens	11.25
New England, del.	12.50
St. Louis, del.	11.75
Birmingham, ovens	7.50
Indianapolis, del.	10.75
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	11.25
Detroit, del.	11.00
Philadelphia, del.	11.15

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	25.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.)	14.75c
Do. (1000 lbs. or over)	13.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$24.00	$24.50	$23.50	$25.00
Birdsboro, Pa.	24.00	24.50	23.50	25.00
Birmingham, Ala.‡	19.38	.....	18.38	24.00
Buffalo	23.00	23.50	22.00	24.00
Chicago	23.00	23.00	22.50	23.50
Cleveland	23.00	23.00	22.50	23.50
Detroit	23.00	23.00	22.50	23.50
Duluth	23.50	23.50	.....	24.00
Erie, Pa.	23.00	23.50	22.50	24.00
Everett, Mass.	24.00	24.50	23.50	25.00
Granite City, Ill.	23.00	23.00	22.50	23.50
Hamilton, O.	23.00	23.00	22.50	.....
Neville Island, Pa.	23.00	23.00	22.50	23.50
Provo, Utah	21.00	.....	.....	.....
Sharpsville, Pa.	23.00	23.00	22.50	23.50
Sparrow's Point, Md.	24.00	.....	23.50	.....
Swedeland, Pa.	24.00	24.50	23.50	25.00
Toledo, O.	23.00	23.00	22.50	23.50
Youngstown, O.	23.00	23.00	22.50	23.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	24.39	24.39	23.89	24.89
Baltimore from Birmingham	24.78	.....	23.66	.....
Boston from Birmingham	24.12	.....	.....	.....
Boston from Everett, Mass.	24.50	25.00	24.00	25.50
Boston from Buffalo	24.50	25.00	24.00	25.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00	.....	.....
Canton, O., from Cleveland	24.39	24.39	23.89	24.89
Chicago from Birmingham	†23.22	.....	.....	.....
Cincinnati from Hamilton, O.	23.24	24.11	23.61	.....
Cincinnati from Birmingham	23.06	.....	22.06	.....
Cleveland from Birmingham	23.32	.....	22.82	.....
Mansfield, O., from Toledo, O.	24.94	24.94	24.44	24.44
Milwaukee from Chicago	24.10	24.10	23.60	24.60
Muskegon, Mich., from Chicago, Toledo or Detroit	26.19	26.19	25.69	26.69
Newark, N. J., from Birmingham	25.15	.....	.....	.....
Newark, N. J., from Bethlehem	25.53	26.03	.....	.....
Philadelphia from Birmingham	24.46	.....	23.96	.....
Philadelphia from Swedeland, Pa.	24.84	25.34	24.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	25.31	25.31	24.81	25.81

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	23.50	23.50	23.00	....
St. Louis from Birmingham	†23.12	....	22.62	....
St. Paul from Duluth	25.63	25.63	....	26.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $28.50, base; $29.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$22.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	22.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Domestic dead - burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$50.00
Chem. bonded chrome	50.00
Magnesite brick	72.00
Chem. bonded magnesite	61.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail.	22.00
Do. barge	22.00
No. 2 lump	22.00

Ferroalloy Prices

Ferromanganese, 78-82%, lump and bulk, carlots tide., duty pd. $100.00
Ton lots 110.00
Less ton lots 113.50
Less 200 lb. lots 118.00
Do., carlots del. Pitts. 105.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 32.00
Do., 26-28% 39.50

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 82.00
Do., 75 per cent 126.00
Do. ton lots 142.00
Spot, $5 a ton higher.

Silicomanganese, c.l., 2% per cent carbon, 103.00
2% carbon, 108.00; 1%, 118.00
Contract ton price $12.50 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.90-2.00

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant, Tenn. 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 11.00c
Do., ton lots 11.75c
Do., less-ton lots 12.00c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	17.50c	18.25c	18.75c
1% carb.	18.50c	19.25c	19.75c
0.10% carb.	20.50c	21.25c	21.75c
0.20% carb.	19.50c	20.25c	20.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots. 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, freight allowed, lb. spot carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot, ¼c higher.

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 84.00c
Do., spot 89.00c
88% chrome, contract 83.00c
Do., spot 88.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ¼-in., lb. 14.00c
Do., 2% 12.50c
Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $69.50
Ton lots 79.50
Less-ton lots, lb. 3.75c
Less 200 lb. lots, lb. 4.00c
Spot ¼-cent higher.

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.00c
Ton lots 5.50c
Less-ton lots 5.75c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton $97.50
Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: SAE 2300	Cold Drawn Bars: SAE 3100
Boston	3.98	3.86	4.86	3.85	3.85	5.66	3.51	4.48	4.66	3.46	4.13	8.63	7.23
New York Met.)	3.84	3.76	3.76	3.76	3.75	5.56	3.38	4.40	4.05	3.31	4.09	8.59	7.19
Philadelphia	3.85	3.75	4.25	3.55	3.55	5.25	3.35	4.05	4.50	3.31	4.06	8.56	7.16
Baltimore	3.95	4.05	4.45	3.70	3.70	5.25	3.55	....	5.05	....	4.05	....	..
Norfolk, Va.	4.15	4.25	....	3.90	3.90	5.45	3.75	....	5.40	....	4.15	....	....
Buffalo	3.35	3.62	3.62	3.62	3.40	5.25	3.05	4.30	4.45	3.22	3.75	8.15	6.75
Pittsburgh	3.35	3.40	3.40	3.40	3.40	5.00	3.15	....	4.75	.	3.65	8.15	6.75
Cleveland	3.25	3.30	3.30	3.40	3.58	5.18	3.15	4.05	4.42	3.20	3.75	8.15	6.75
Detroit	3.43	3.23	3.48	3.60	3.65	5.27	3.23	4.30	4.84	3.20	3.80	8.45	7.05
Omaha	3.90	3.80	3.80	3.95	3.95	5.55	3.45	....	5.00	....	4.42	....	....
Cincinnati	3.60	3.47	3.47	3.65	3.68	5.28	3.22	4.00	4.67	3.47	4.00	8.50	7.10
Chicago	3.50	3.40	3.40	3.55	3.55	5.15	3.05	4.10	4.60	3.30	3.75	8.15	6.75
Twin Cities	3.75	3.65	3.65	3.80	3.80	5.40	3.30	4.35	4.75	3.63	4.34	8.84	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
St. Louis	3.62	3.52	3.52	3.47	3.47	5.07	3.18	4.12	4.87	3.41	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Indianapolis	3.60	3.55	3.55	3.70	3.70	5.30	3.25	....	4.76	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.68	3.70	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.33	4.33	5.93	3.99	....	5.71	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.88	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	4.05	6.20	6.20	4.05	4.05	5.75	4.20	....	5.25	....	....	....	....
Seattle	4.00	3.85	5.20	3.40	3.50	5.75	3.70	6.50	4.75	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.60	4.45	4.00	4.00	6.40	4.30	6.50	5.25	....	6.60	10.65	9.80
San Francisco	3.50	4.00	6.00	3.35	3.35	5.60	3.40	6.40	5.15	....	6.80	10.65	9.80

	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	....
Philadelphia	4.10	7.31	5.86	5.61	8.56
Baltimore	4.10	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.20	5.75	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.48	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.40	8.55	8.40	9.05
San Francisco	5.00	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 300-4999 in San Francisco, Portland; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, 1500-3499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle, San Francisco; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 1500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 10 to 49 bundles in Philadelphia.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, May 23

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental North Sea ports, gross tons‡‡ **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$19.20 6 0 0	$33.23	3 18 0
Basic bessemer	....	.....	.....
Hematite, Phos. .03-.05	20.00 6 5 0	.....	.....
Billets	....	$31.95	3 15 0
Wire rods, No. 5 gage	....	60.71	7 2 6
Standard rails	$33.60 10 10 0	$48.99	5 15 0
Merchant bars	1.91c 13 9 0	2.77c	7 6 0
Structural shapes	1.72c 12 2 6	2.83c	7 9 0
Plates, †¼ in. or 5 mm.	1.83c 12 17 6	3.53c	9 6 0
Sheets, black, 24 gage or 0.5 mm	2.41c 17 0 0	2.98c	7 17 0°
Sheets, gal., 24 ga., corr.	2.88c 20 6 3	3.94c	10 7 6
Bands and strips	....	2.76c	7 5 0
Plain wire, base	....	3.15c	8 6 3
Galvanized wire, base	....	3.75c	9 17 6
Wire nails, base	....	3.56c	9 7 6
Tin plate, box 108 lbs.	$ 5.12 1 12 0	....	.....

British ferromanganese $100.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian §§Francs		Reich §§Mar
Fdy. pig iron, Si. 2.5.	$17.76	5 11 0(a)	$14.34	788	$31.44	950	$25.33	63
Basic bess. pig iron	16.72	5 4 6(a)	.....	...	29.79	900	27.94	(b)69.50
Furnace coke	5.17	1 11 8	4.10	225	10.92	330	7.64	19
Billets	30.00	9 7 6	21.17	1,163	42.20	1,275	38.79	96.
Standard rails	1.59c	11 3 0	1.27c	1,588	2.06c	1,375	2.38c	132
Merchant bars	2.00c	14 0 0††	1.16c	1,454	2.06c	1,375	1.98c	110
Structural shapes	1.77c	12 8 0††	1.13c	1,414	2.06c	1,375	1.93c	107
Plates, †¼-in. or 5 mm.	1.79c	12 10 6††	1.48c	1,848	2.42c	1,610	2.29c	127
Sheets, black	2.50c	17 10 0§	1.75c	2,193‡	2.85c	1,900‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.98c	20 16 3††	2.87c	3,589	4.80c	3,200	6.66c	370
Plain wire	2.79c	19 10 0	1.87c	2,340	3.00c	2,000	3.11c	173
Bands and strips	2.11c	14 15 0††	1.31c	1,632	2.48c	1,650	2.29c	127

†British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling not quoted. §§Last prices, no current quotations. ‡‡No quotations

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	15.00
Bos. dock No. 1 exp.	15.50
New Eng. del. No. 1	14.50-15.00
Buffalo ,No. 1	18.00-18.50
Buffalo, No. 2	16.00-16.50
Chicago, No. 1	17.00-17.50
Chicago, auto, no alloy	16.00-16.50
Cincinnati, dealers	13.75-14.25
Cleveland, No. 1	17.50-18.00
Cleveland, No. 2	16.50-17.00
Detroit, No. 1	†15.00-15.50
Detroit, No. 2	†14.00-14.50
Eastern Pa., No. 1	18.50
Eastern Pa., No. 2	17.00
Federal, Ill. No. 2.	14.50-15.00
Granite City, R. R. No. 1	†15.00-15.50
Granite City, No. 2.	14.00-14.50
Los Ang., No. 1, net	11.50-12.00
Los Ang., No. 2, net	10.50-11.00
N. Y. dock No. 1 exp.	14.50
Pitts., No. 1 (R. R.)	20.00-20.50
Pittsburgh, No. 1	19.00-19.50
Pittsburgh, No. 2	17.50-18.00
St. Louis, No. 1	†15.00-15.50
St. Louis, No. 2	†14.00-14.50
San Fran., No. 1, net	11.50-12.00
San Fran., No. 2, net	10.50-11.00
Seattle, No. 1	13.00-14.00
Toronto, dirs., No. 1	11.00
Valleys, No. 1	18.00-18.50

COMPRESSED SHEETS

Buffalo, new	16.50-17.00
Chicago, factory	16.50-17.00
Chicago, dealers	15.00-15.50
Cincinnati, dealers	13.25-13.75
Cleveland	17.50-18.00
Detroit	†16.25-16.75
E. Pa., new mat.	18.00-18.50
E. Pa., old mat.	15.00-15.50
Los Angeles, net	9.00- 9.50
Pittsburgh	19.00-19.50
St. Louis	†12.50-13.00
San Francisco, net	9.00- 9.50
Valleys	17.50-18.00

BUNDLED SHEETS

Buffalo, No. 1	16.00-16.50
Buffalo, No. 2	14.00-14.50
Cleveland	14.00-14.50
Pittsburgh	17.50-18.00
St. Louis	†10.50-11.00
Toronto, dealers	9.75

SHEET CLIPPINGS, LOOSE

Chicago	12.00-12.50
Cincinnati, dealers	9.25- 9.75
Detroit	†13.00-13.50
St. Louis	†9.50-10.00
Toronto, dealers	9.00

BUSHELING

Birmingham, No. 1	13.00
Buffalo, No. 1	16.00-16.50
Chicago, No. 1	16.50-17.00
Cincin., No. 1 deal.	9.75-10.25
Cincin., No. 2 deal.	3.75- 4.25
Cleveland, No. 2	11.00-11.50
Detroit, No. 1, new	†15.00-15.50
Valleys, new, No. 1	17.50-18.00
Toronto, dealers	5.50- 6.00

MACHINE TURNINGS (Long)

Birmingham	5.00
Buffalo	10.50-11.00
Chicago	11.00-11.50
Cincinnati, dealers	6.00- 6.50
Cleveland, no alloy	10.50-11.00
Detroit	†9.75-10.25
Eastern Pa.	10.50-11.00
Los Angeles	4.00- 5.00
New York	†6.50- 7.00
Pittsburgh	12.50-13.00
St. Louis	†7.50- 8.00
San Francisco	5.00
Toronto, dealers	7.00- 7.25
Valleys	11.50-12.00

SHOVELING TURNINGS

Buffalo	12.50-13.00
Cleveland	11.00-11.50
Chicago	11.50-12.00
Chicago, spcl, anal.	14.50-15.00
Detroit	†10.50-11.00
Pitts., alloy-free	13.50-14.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†4.00- 4.25
Buffalo	10.25-10.75
Cincinnati, dealers	5.00- 5.50
Cleveland	11.00-11.50
Eastern Pa.	10.00-10.50
Detroit	†10.00-10.50
New York	†6.25- 6.50
Pittsburgh	10.00-10.50
Toronto, dealers	6.75

AXLE TURNINGS

Buffalo	16.00-16.50
Boston district	†8.00- 8.50
Chicago, elec. fur.	17.50-18.00
East. Pa. elec. fur.	16.00-16.50
St. Louis	†10.50-11.00
Toronto	6.00- 6.50

CAST IRON BORINGS

Birmingham	7.50
Boston dist. chem.	†8.25- 8.50
Buffalo	10.25-10.75
Chicago	10.50-11.00
Cincinnati, dealers	5.00- 5.50
Cleveland	11.00-11.50
Detroit	†10.00-10.50
E. Pa., chemical	14.50-15.00
New York	†7.00
St. Louis	†6.25- 6.75
Toronto, dealers	6.75

RAILROAD SPECIALTIES

Chicago	20.00-20.50

ANGLE BARS—STEEL

Chicago	20.50-21.00
St. Louis	†17.50-18.00

SPRINGS

Buffalo	21.00-21.50
Chicago, coil	21.50-22.00
Chicago, leaf	19.50-20.00
Eastern Pa.	22.50-23.00
Pittsburgh	22.50-23.00
St. Louis	†18.00-18.50

STEEL RAILS, SHORT

Birmingham	16.50
Buffalo	22.50-23.00
Chicago (3 ft.)	20.50-21.00
Chicago (2 ft.)	21.00-21.50
Cincinnati, dealers	19.25-19.75
Detroit	†21.00-21.50
Pitts., 3 ft. and less	22.50-23.00
St. Louis, 2 ft.& less	†18.75-19.25

STEEL RAILS, SCRAP

Birmingham	16.00
Boston district	†14.50-15.00
Buffalo	19.00-19.50
Chicago	17.50-18.00
Cleveland	20.00-20.50
Pittsburgh	20.00-20.50
St. Louis	†16.50-17.00
Seattle	18.00-18.50

PIPE AND FLUES

Chicago, net	12.50-13.00
Cincinnati, dealers	10.75-11.25

RAILROAD GRATE BARS

Buffalo	13.00-13.50
Chicago, net	12.50-13.00
Cincinnati, dealers	8.75- 9.25
Eastern Pa.	16.00-16.50
New York	†11.00-11.50
St. Louis	†10.50-11.00

RAILROAD WROUGHT

Birmingham	14.00
Boston district	†9.50-10.00
Eastern Pa., No. 1	19.00
St. Louis, No. 1	†12.00-12.50
St, Louis, No. 2	†14.00-14.50

FORGE FLASHINGS

Boston district	†10.25-10.50
Buffalo	16.00-16.50
Cleveland	15.50-16.00
Detroit	†14.50-15.00
Pittsburgh	16.50-17.00

FORGE SCRAP

Boston district	†7.00
Chicago, heavy	20.00-20.50

LOW PHOSPHORUS

Cleveland, crops	22.50-23.00
Eastern Pa. crops	22.50-23.00
Pitts., billet, bloom, slab crops	23.00-23.50

LOW PHOS. PUNCHINGS

Buffalo	21.00-21.50
Chicago	19.50-20.00
Cleveland	19.50-20.00
Eastern Pa.	22.50-23.00
Pittsburgh	22.00-22.50
Seattle	15.00
Detroit	†16.50-17.00

RAILS FOR ROLLING

5 feet and over

Birmingham	16.50
Boston	†15.75-16.00
Chicago	21.00-21.50
New York	†16.00-16.50
Eastern Pa.	20.00-20.50
St. Louis	†18.50-19.00

STEEL CAR AXLES

Birmingham	18.00
Boston district	†17.00-17.50
Chicago, net	22.50-23.00
Eastern Pa.	23.00-23.50
St. Louis	†19.50-20.00

LOCOMOTIVE TIRES

Chicago (cut)	20.00-20.50
St. Louis, No. 1	†15.75-16.25

SHAFTING

Boston district	†17.25-17.50
New York	†18.00-18.50
Eastern Pa.	23.00-23.50
St. Louis, 1¼-3⅞"	†17.25-17.75

CAR WHEELS

Birmingham, iron	13.00
Boston dist., iron	†13.00-13.25
Buffalo, steel	23.00-23.50
Chicago, iron	18.50-19.00
Chicago, rolled steel	19.50-20.00
Cincin., iron, deal.	17.25-17.75
Eastern Pa., iron	20.50-21.00
Eastern Pa., steel	21.50-22.50
Pittsburgh, iron	20.00-20.50
Pittsburgh, steel	22.50-23.00
St. Louis, iron	†15.50-16.00
St. Louis, steel	†18.00-18.50

NO. 1 CAST SCRAP

Birmingham	15.50
Boston, No. 1 mach.	†16.00-16.50
N. Eng. del. No. 2	14.75-15.00
N. Eng. del. textile	18.00-18.50
Buffalo, cupola	18.50-19.00
Buffalo, mach.	20.00-20.50
Chicago, agri. net	14.00-14.50
Chicago, auto net	16.50-17.00
Chicago, railroad net	15.00-15.50
Chicago, mach. net.	15.50-16.00
Cincin., mach. deal.	17.25-17.75
Cleveland, mach.	20.50-21.00
Detroit, cupola, net.	†16.50-17.00
Eastern Pa., cupola	20.50-21.00
E. Pa., No. 2 yard	17.50
E. Pa., yard fdry.	17.50-18.00
Los Angeles	16.50-17.00
Pittsburgh, cupola	19.00-19.50
San Francisco	14.50-15.00
Seattle	12.00-14.00
St. Louis, agri. mach.	†16.25-16.75
St. L., No. 1 mach.	†16.25-16.75
Toronto, No. 1 mach., net dealers	18.00-18.50

HEAVY CAST

Boston dist. break.	†13.50-14.00
New England, del.	15.00-15.25
Buffalo, break	16.00-16.50
Cleveland, break, net	15.50-16.00
Detroit, auto net	†17.00-17.50
Detroit, break	†15.00-15.50
Eastern Pa.	19.50
Los Ang., auto, net.	13.00-14.00
New York break	†15.00-15.50
Pittsburgh, break	16.50-17.00

STOVE PLATE

Birmingham	10.00
Boston district	†10.50-11.00
Buffalo	14.50-15.00
Chicago, net	10.50-11.00
Cincinnati, dealers	9.50-10.00
Detroit, net.	†10.50-11.00
Eastern Pa.	16.00-16.50
New York fdry.	†11.50
St. Louis	†11.50-12.00
Toronto dealers, net	12.00

MALLEABLE

New England, del.	21.50-22.00
Buffalo	20.00-20.50
Chicago, R. R.	20.50-21.00
Cincin., agri., deal.	14.75-15.25
Cleveland, rail.	22.00-22.50
Eastern Pa., R. R.	22.00-22.50
Los Angeles	12.50
Pittsburgh, rail	22.50-23.00
St. Louis, R. R.	†17.00-17.50

Ores

Lake Superior Iron Ore

Gross ton, 51½ %

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract.	9.00-10.00

Foreign Ore (Prices nominal)

Cents per unit. c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mn.	15.00
North African low phos.	nom.
Spanish, No. African basic, 50 to 60%	nom.
Chinese wolframite, short ton unit, duty paid	$23.50-24.00
Scheelite, imp.	$25.00
Chrome ore, Indian, 48% gross ton, cif.	$26.00-28.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	48.00-50.00
So. African, 52%	49.00-50.00
Indian, 49-50%	nom.
Brazilian, 48-52%	46.00-48.00
Cuban, 50-51%, duty free	61.20

Molybdenum

Sulphide conc., per lb., Mo. cont., mines	$0.75

—The Market Week—

Sheets, Strip

Sheet & Strip Prices, Pages 84, 85

Pittsburgh—Sheet and strip releases continue to increase under pressure from producers to lighten backlogs as fast as possible. War and defense developments are stimulating specifications, particularly in the East, and in many cases original orders have been boosted as buyers start to build up stocks. Mills look for little business as a result of the government preparedness campaign to develop before fall.

Cleveland—Flat-rolled steel specifications are in fair volume, although buyers still show some restraint in releasing tonnage against April's blanket commitments. Market conditions are strengthening producers' stand in requiring delivery of low-price orders to be completed by June 30.

Chicago—Sheet and strip steel specifications are increasing as mills attempt to get releases in time to make shipments by June 30. Buying is at a standstill, as practically all consumers are well covered. Furniture, household equipment and refrigerator interests are prominent among major consumers.

Boston — Cold strip mill operations are rising gradually as specifications against low-priced blanket contracts placed late last month mount. Operations next month may approach a peak. Incoming volume is well ahead of last month, but current new buying is light, activity being centered around blanket commitments. There is no change from normal on hot strip shipments to re-rollers.

New York—Further gain is noted in sheet specifications, principally for delivery late in June against contracts placed at the $4 concession late in April, although sellers are disappointed with volume of such business. Requirements for stoves, electric refrigerators and other household equipment are holding up fairly well. Though warehouses have experienced a better month, they have been slow in releasing new specifications.

Buffalo — Releases against heavy bookings of sheet and strip steel items are improved. Rolling schedules of mills have been increased to somewhere around 70 per cent of capacity.

Philadelphia — Several sheet producers report specifications now are in on approximately 70 per cent of the low-priced tonnage booked recently. Automotive body and frame makers are well along on die programs for 1941 cars and some pre-

Made-to-Order

FORGINGS

● *Forged carbon-steel shaft; length 21 feet, 10 inches; weight 14,300 pounds.*

Standard Steel Works Company specializes on forgings of unusual design or size to meet the special requirements of the customer.

Good steel, long experience and close control of every step in manufacture, from open-hearth to finished product, assure the satisfactory quality of every Standard forging.

CASTINGS • FORGINGS • WELDLESS RINGS • WROUGHT STEEL WHEELS

STANDARD STEEL WORKS CO.

THE BALDWIN GROUP

Subsidiary of THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA

liminary runs already have been made. Additional specifications for stainless strip for a large trailer order will be placed shortly, possibly covering requirements for the balance of the year.

St. Louis — Warehouses are awaiting further depletion of inventories of galvanized sheets before placing additional orders, and trade in that item is quiet. While protective orders were placed for hot-rolled sheets at cut prices, releases have been relatively slow.

Cincinnati—Sheet and strip releases have been heavy and insistence on delivery before June 30 on material bought at lower prices indicates even heavier production. Some buying is being done at the restored price and some classifications are being produced at 90 per cent of capacity. Automotive demand is good but electrical and galvanized sheets lag.

Toronto, Ont. — Despite the fact that Canadian mills are booked into August with deliveries about the end of July on new orders, demand for sheets continues active. The automotive industry is placing large orders in connection with big truck building operations, and there also is good call from electrical equipment makers. Most new business, however, continues to go to United States producers and it is expected that this demand will be further increased.

Birmingham, Ala. — Sheet and strip releases continue substantial, with some releases against recent blanket orders. Production is steady at probably a little better than 80 per cent. Strip, largely cotton ties, is being turned out in fairly substantial volume.

In America's largest Stainless Steel Mill

. . . ARMSTRONG'S BRICK AID FURNACE ECONOMY AND PROMOTE ACCURATE TEMPERATURE CONTROL

Sides and arches of four semi-muffle type normalizing furnaces in America's largest stainless steel plant were insulated for maximum operating economy and temperature control with Armstrong's Brick.

YEARS of satisfactory performance in the field, and extensive laboratory tests have proved that Armstrong's Insulating Fire Brick offer the kind of protection modern furnaces require. There's further proof of their wide acceptance in the use of these brick in four normalizing furnaces of America's largest mill for cold rolling and finishing stainless steel.

You can depend on Armstrong's Brick for accurate control of furnace temperatures, lower fuel costs, and greater efficiency—in almost any type of furnace design. There are five individual Armstrong's Brick available to meet varying temperature and service requirements. For literature, write to Armstrong Cork Company, Building Materials Division, 985 Concord Street, Lancaster, Pennsylvania.

QUICK FACTS ABOUT ARMSTRONG'S INSULATING FIRE BRICK

- Ample insulating value
- High crushing strength
- Accurate sizing
- High spalling resistance
- High salvage value
- Complete line for wide temperature range
- Ability to withstand handling in shipping and installing
- Special shapes of all types and sizes

Armstrong's

HIGH TEMPERATURE INSULATION

Plates

Plate Prices, Page 84

Pittsburgh—Demand has shown a considerable increase, with mill activity now at the highest point this year. Shipbuilding and railroad car construction continue to take large tonnages of plates, and pipeline demand has accounted for several recent placements of fair size.

Chicago—Demand continues good, with improvement noted by several mills. Prices are firming and operations of fabricators have improved. Business is coming from a wide range of sources, including government dam work, bridgework, the petroleum industry and heavy equipment and machinery manufacturers.

Boston — Miscellaneous consumers, buying in small lots, are stimulating demand, although volume continues to lag. Orders are more numerous, but few carload releases are being specified and prompt delivery is asked. Two water storage tanks are under consideration, and shipbuilding contracts involving destroyers and submarines now up for bids are expected.

Philadelphia — Plate demand has increased considerably, as reflected in rising operations of leading independent producers. For the first time in many weeks rolling schedules in several plants have been expanded sharply. One plant, as an example, has stepped up output 100 per cent from the rate prevailing for two months.

Bath Iron Works, Bath, Me., is low bidder at $2,198,000 each on four single screw turbine propulsion cargo vessels for American Export Lines, rated at 16½ knots. The vessels are about the same size as C-1 boats and will require about 3800 tons of bars, plates and shapes each. Sun Shipbuilding & Dry Dock Co., Chester, Pa., and Pusey & Jones Co., Wilmington, Del., advised the maritime commission they were unable to submit bids on these vessels.

Birmingham, Ala.—Even though

no strictly war plate tonnage is included, local output continues steady. Considerable volume of plates is going to tank manufacturers, and some into railroad construction. Republic Steel Corp. continues to move considerable tonnage to the Pacific coast.

Seattle — Important projects are lacking, none up for bids at the moment. Current operations at local shops are being retarded by a strike of machinists. Vancouver, Wash., has received bids for two 50,000-gallon water storage tanks, bids for one tank having previously been rejected. Tonnage is unstated.

San Francisco — The only plate award of size went to Western Pipe & Steel Co., 575 tons for outlet pipes for the Friant dam, Central Valley project, California. So far this year 25,363 tons have been booked, compared with 16,480 tons for the same period a year ago.

Toronto, Ont. — Shipbuilding, boiler and tank activities call for larger deliveries of plates. Inquiries show some improvement and local representatives of United States producers state that orders are running at record proportions for early delivery. Canadian producers report capacity for sheet production practically fully contracted for the remainder of the year.

Plate Contracts Placed

575 tons, outlet pipes, specification 903, Friant Dam, Central Valley project, California, to Western Pipe & Steel Co., San Francisco.

Plate Contracts Pending

4200 tons, 50 and 59-inch welded steel or concrete pipe, metropolitan water district, Los Angeles, J. F. Shea Co. Inc., 617 South Olive street, Los Angeles, low on general contract on welded basis at $800,867, and Southwest Welding Co., low on subcontract for welded steel pipe.

375 tons, 42, 48 and 52-inch steel riveted or welded pipe, water mains, route 6, section 9, Passaic county, New Jersey; Santaniello Bros. Jersey City, low, $85,663.30, bids May 17, Trenton.

Unstated tonnage, 200,000-gallon elevated steel tank, naval air station, Jacksonville, Fla.; bids June 11, spec. 9788.

Unstated tonnage, two welded steel barges, proposal 352, United States engineer, first district, New Orleans, bids May 31.

Ransome Concrete Machinery Co., Dunellen, N. J., has appointed Welding Engineering Sales Corp., New York, its sales representative in state of New York and a portion of of New Jersey for its line of welding tables and positioners. Ransome has also appointed Hawaiian Gas Products Ltd., Honolulu, Hawaii, exclusive representative in Hawaii.

Bars

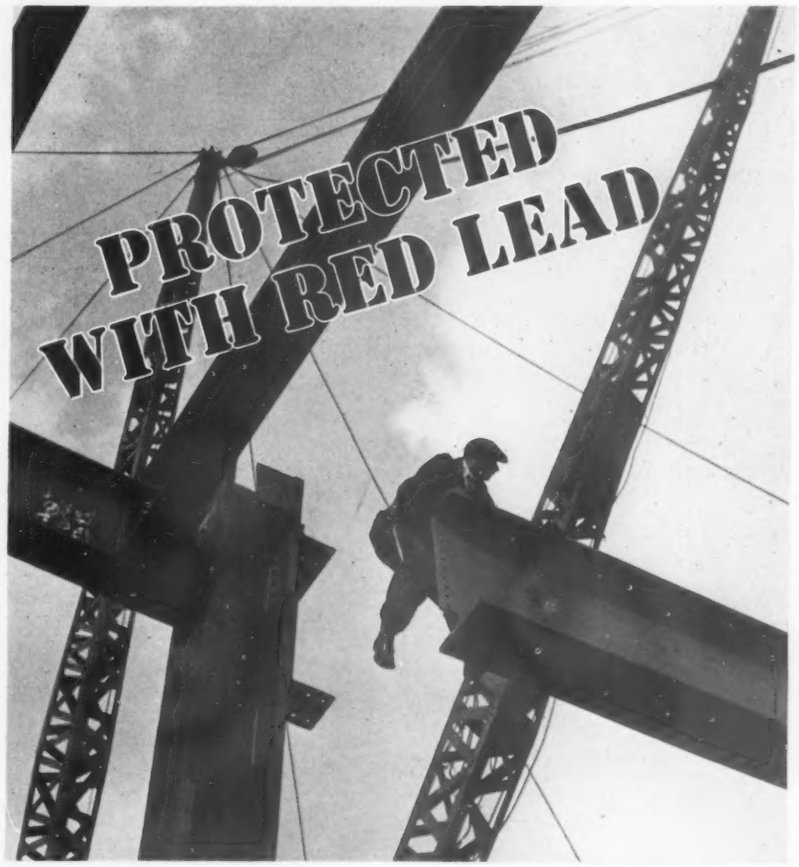
Bar Prices, Page 84

Cricago—Carbon and alloy bars are most improved in demand. Releases and orders are heavier, according to producing mills, and further increases in purchasing are anticipated.

Pittsburgh—Orders are considerably better as many consumers are filling forward needs in anticipation of deferred mill deliveries. Some buyers have advanced release dates on old orders and placed additional tonnage on books. Cold finished bars are moving relatively slow, but some producers are expecting shell orders. Flurry in the merchant market is general, with no particular industry responsible.

While bar prices have been fairly firm there are further evidences of a strengthening, with most present business at the full published quotation of 2.15c.

Boston — Demand tends upward with consumption, particularly of alloys, mounting. Machine tool



The very moment that a steel column, girder or beam is fabricated for bridge or building, it is painted, and the best protection as a shop coat for steel is red lead and linseed oil.

In spite of the great strength and endurance of steel, it is extremely vulnerable to corrosion.

As the cost of painting is largely the labor of application, the saving in using a cheap paint, as against time-tested red lead, is infinitesimal compared to the cost of the structure.

Pure red lead and linseed oil has been the world's standard metal-protective paint for generations. The film adheres closely to the steel; it is elastic and is not broken by expansion or contraction.

Give steel its due by giving it the greatest protection from the elements.

ST. JOSEPH LEAD COMPANY

The Country's Largest Producer of Domestic Pig Lead

250 PARK AVE. · NEW YORK

TEL. ELDORADO 5-3200

builders continue as leading consumers, although demand has broadened in other directions. While distributors are able to meet customer needs, they are pressing mills to improve deliveries of special heat-treated alloys. Henry Disston & Sons Co., Philadelphia, has been awarded 135,000 pounds of chromium-molybdenum bars at 9.22c, delivered, Springfield, Mass., armory, where production of the Garand automatic rifle is being increased.

Philadelphia — Commercial bar tonnage has increased considerably from a number of sources, including machine tool makers, manufacturers of screw machine products and the jobbing trade. Prices are well maintained.

Birmingham, Ala. — Bar demand and production continue relatively good, bars being one of the most active products. Sales are holding at a good level and mills report additional bookings.

Buffalo — Improved demand for bars is spotty. Miscellaneous buying has been sufficient to offset a seasonal tapering in releases from automotive interests and partsmakers. Aircraft and munitions supplies are expected to increase purchases in the near future.

Toronto, Ont. — Merchant bar sales are gaining steadily as demand increases for special war materials. Consumers show more interest and inquiries are beginning to appear for delivery in third quarter although producers still have supplies available for delivery before the end of June.

Pipe

Pipe Prices, Page 85

Pittsburgh—Pipe production is up slightly, due mainly to continued increased shipments to consigned stocks of standard pipe. There is little change in oil country goods, volume running about the same as one month ago and one year ago. Line pipe is off somewhat from last month, but there has been a slight advance in mechanical tubing and in pressure tubes.

Cleveland—Standard pipe business is more active, heavier shipments to distributors resulting from further gains in private building work. Residential needs are outstanding, but requirements for public construction still lag. Export demand continues active. Markets for oil country goods disclose little change in volume.

New York — Department of purchase, New York city, closes May 28 on 12,200 tons of cement-lined cast pipe for yard stocks. Inquiry also includes 455 tons of fittings and is the largest in this district in several years. Buying in other directions is slightly heavier. Export inquiry and buying, notably by South America, is brisk.

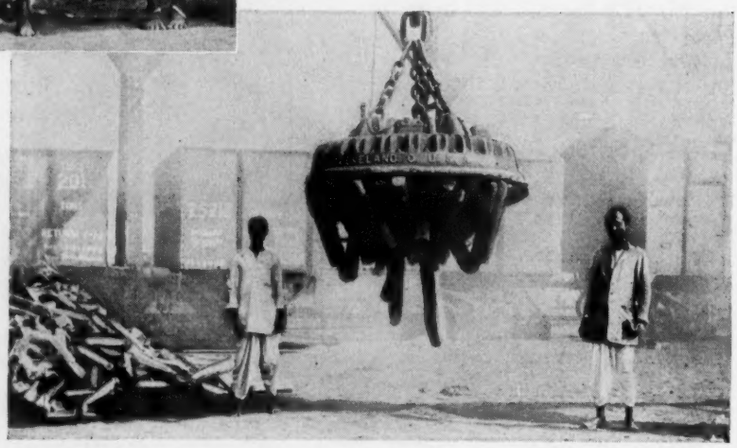
Birmingham, Ala.—Although aggregate production is well maintained by virtue of business from municipalities, mostly from the Pacific coast, the pipe market is not as reassuring as hoped.

San Francisco—Demand for cast iron pipe has fallen off and only one letting of size was reported placed. American Cast Iron Pipe Co. took 203 tons for Fresno, Calif. Awards aggregated 385 tons and brought the year's total to 14,098 tons as compared with 11,254 tons for the corresponding period in 1939.

Seattle—Cast iron pipe is moving in small volume, no important projects being up. There is slight indication of improvement during the summer.

Toronto, Ont.—Demand for pipe in connection with sewage and waterworks is active and large tonnage orders are in prospect for early closing. Among the larger

This job pays 15¢ a day



IMAGINE carrying pig iron on your head all day long for about the price of one quart of milk . . . yet an EC&M Lifting Magnet proves more economical. It doesn't tire in the scorching heat of India—works just as well, too, in rain or snow of northern climates.

Used on caterpillar, steam and overhead cranes or similar material-handling machines, thousands of EC&M Lifting Magnets are helping offset increased taxes and labor costs in America. Investigate them.

Bulletin 900 shows how EC&M Magnets profitably handle rails, kegs of nails, scrap iron, bundles of steel, etc. Ask for a copy.

THE ELECTRIC CONTROLLER & MFG. CO. E&M CLEVELAND, OHIO

HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS.

projects is that for the $250,000 pipe line for the $3,000,000 pulp mill at Port Alberni, B. C., for Bloedel, Stewart & Welch.

Steel Pipe Placed

3000 tons, 14-inch steel pipe piling for National Mutual Insurance Co. building, Hartford, Conn., to National Tube Co., Pittsburgh.

Cast Pipe Placed

225 tons, 12 and 16-inch, Rahway, N. J., to United States Pipe & Foundry Co., Burlington, N. J.

203 tons, 4 to 10-inch, Fresno, Calif., to American Cast Iron Pipe Co., Birmingham, Ala.

Cast Pipe Pending

12,200 tons, cement-lined, 20-inch and under, yard stocks, department of purchase, New York, bids May 28. Inquiry also includes 455 tons of fittings.

458 tons, 6 to 12-inch, Santa Rosa, Calif.; city purchased steel pipe.

274 tons, 6 to 14-inch, Alhambra, Calif.; bids opened.

200 tons, 2 to 6-inch for water district, Portland, Oreg.; bids in.

150 tons, 8-inch, Yonkers, N. Y.; bids in.

Helping to pay for the crane is another important advantage of the EC&M Lifting Magnet. The above is a Northwest Caterpillar Crane equipped with an EC&M No. 3½ Type SA 39-inch diameter Lifting Magnet working in a Wisconsin scrapyard.

THE ELECTRIC CONTROLLER & MFG. CO.
2698-S EAST 79TH ST. CLEVELAND, OHIO

Rails, Cars

Track Material Prices, Page 85

Locomotive buying is the feature of the railroad market at present with an unusual number placed last week. The Terminal Railroad association, St. Louis, has distributed ten diesel-electric locomotives among three builders, and the Chicago, Burlington & Quincy has placed nine with a Chicago builder. United States district court has authorized Missouri Pacific to buy 30 covered 70-ton cement hoppers. Western Maryland is inquiring for 12 steam locomotives.

Inquiry for 1200 to 1250 freight cars by the Gulf, Mobile & Northern has not been acted on and is the largest group now pending.

Locomotives Placed

Chicago, Burlington & Quincy, two 1000-horsepower and seven 600-horsepower diesel-electric switchers, to Electro-Motive Corp., La Grange, Ill.

Terminal Railroad association, St Louis, ten diesel-electric locomotives, as follows: Electro-Motive Corp., La Grange, Ill., four 600-horsepower and two 1000-horsepower; Baldwin Locomotive Works, Philadelphia, and American Locomotive Co., New York, two 600-horsepower each.

Locomotives Pending

Army, one 45-ton mechanical-drive diesel locomotive for Brooklyn, N. Y.; bids June 13.

Navy, two 50-ton diesel-electric locomotives for Mare Island, Calif.; bids June 7.

Western Maryland, twelve 4-6-6-4 locomotives; bids asked.

Car Orders Placed

Alaska railroad, twenty 55-ton hoppers, to Pullman-Standard Car Mfg. Co., Chicago.

Car Orders Pending

Missouri Pacific, thirty 70-ton covered cement hoppers: authorized by United States district court.

Buses Booked

Twin Coach Co., Kent, O.: Twenty-one 41-passenger for Seattle Transit System, Seattle; fifteen 33-passenger for Gray Coach Lines, Toronto, Ont.; nine 37-passenger for Pacific Electric Railway Co., Los Angeles; six 27-passenger for Georgia Power Co., Atlanta, Ga.; six 36-passenger for Cincinnati Street Railway Co., Cincinnati; three 27-passenger for York Bus Co., York, Pa.; three 31-passenger for Mill Power Supply Co., Charlotte, N. C.; three 33-passenger for Penn-Ohio Coach Lines, Youngstown, O.; two 27-passenger for South Carolina Power Co., Charleston, S. C.; two 24-passenger for Buffalo Transit Co., Buffalo; one 27-passenger for Bremerton Transportation Co., Bremerton, Wash.; one 35-passenger for Co-operative Transit Co., Wheeling, W. Va.

Wire

Wire Prices, Page 85

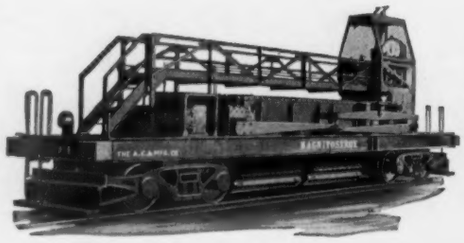
Pittsburgh—Buying of wire products is not active, but releases have been increased from many sources. Buyers in some sections have released all specifications for shipment as soon as possible, and in some cases have added tonnage to the original orders. Most of this buying has been in the merchant field, with warehouses interested in building stocks as much as possible.

Boston—Substantial improvement in demand for numerous wire specialties is gradually increasing finishing mill operations and general buying of the more standard products is also upward. Finishing schedules are heavier, but incoming volume is somewhat uneven with some departments operating well above others.

New York — Acorn Insulated Wire Co., Brooklyn, has been awarded contract for 24,000,000 feet, 24 carloads, field wire, type W-110-B by the procurement division, signal corps, army base, Brooklyn, at $5.96 per 1000 feet delivered. Contract carries a proviso for a 50 per cent increase in the order and was awarded under pro. 394, bids May 14. This wire has a copper core with a combination copper and steel covering, insulated and braided. Under the same bidding 160,802,400 feet is pending, award expected within the next few days.

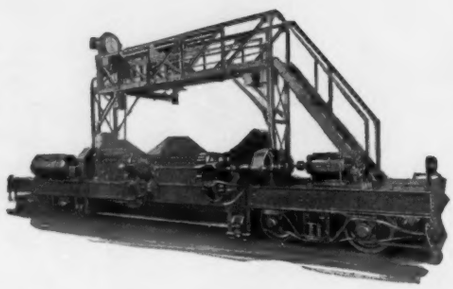
Birmingham, Ala.—Largely on the strength of renewed buying, evident over the past few weeks, wire production is satisfactory, estimated at more than 85 per cent. All items are in good demand.

ATLAS SCALE CARS



20 Ton — Double Compartment Scale Car. Journals provided with self aligning anti-friction bearings. Equipped with Atlas Indicator and Recorder.

20 Ton Two Compartment Scale Car with Orr Bin Gate Operating Mechanism. Anti-friction bearings. Equipped with Atlas Indicating and Recording Mechanism.



Other Atlas Products

Gas-Electric and Diesel-Electric Locomotives—Car Pushers—Storage Battery Locomotives—Electrically Operated Industrial Cars—Scale Cars and Weighing Cars of all kinds — Ore Transfer Cars and Blast Furnace Charging Cars.

Coke Oven Equipment

Pushers and Levellers—Coal Charging Cars—Door Handling Machines — Coke Quenching Cars.

Also Atlas Patented Indicating and Recording Mechanism for Weighing Scales.

THE ATLAS CAR & MFG. CO.

Engineers . . . Manufacturers

CLEVELAND, OHIO

Shapes

Structural Shape Prices, Page 84

Pittsburgh — Demand has shown considerable increase over the past two weeks. Shape contracts placed have not been numerous, but inquiry has been more active. Private construction and public works jobs both account for a fair percentage of the total.

Cleveland—Fabricators are rushed with small industrial projects. While this type of expansion work quickened markedly before the serious turn in the war, the latter occasionally is a factor in the decision to proceed with certain construction. Few large private or public jobs are active here.

Chicago—Structural awards are down slightly, although there has been moderate improvement in fabricating shop operations and a greater diversity. Inquiries include many small private tonnages and several substantial projects. An overhead crossing and underpass at the Union Pacific tracks, Rock Springs, Wyo., will require 453 and 295 tons respectively. Powerhouse for Central Illinois Public Service, Hutsonville, Ill., will require 400 tons.

Boston—Carlo Bianchi & Co. Inc., Framingham, Mass., is low on the general contract for the Hoosic river bridge, a truss and stringer span, North Adams, Mass. Inquiry for

Shape Awards Compared

	Tons
Week ended May 25	20,234
Week ended May 18	22,911
Week ended May 11	32,341
This week, 1939	14,923
Weekly average, year, 1940	17,867
Weekly average, 1939	22,411
Weekly average, April	10,851
Total to date, 1939	465,507
Total to date, 1940	375,211

Includes awards of 100 tons or more.

structural steel is growing, notably requirements for industrial shop additions, close to 3000 tons for such work now being active. Part of this is for work held in abeyance for some months, including projects at Worcester, Pittsfield and Hartford.

New York—While volume of active pending structural steel is down, inquiry is featured by several fair-sized industrial expansion projects. Bridge needs are lower, but New Jersey closes June 7 on spans and underpasses taking 530 tons. A Brooklyn brewery will erect a 1300-ton bottling plant.

Philadelphia—Structural steel requirements this spring have been below expectations although a few lots have appeared recently. Fabricators note less pressure by general contractors for price concessions.

Seattle—Colby Steel & Engineering Co., Seattle, is building two double cantilever cranes, booms 300 feet long, 11-ton capacity at end of boom, for the contractors erecting Friant dam, California, involving about 350 tons. Award is still pending for the Kettle river bridge, Washington state, requiring nearly 1700 tons.

San Francisco—Awards for structural shapes aggregated 4170 tons, bringing the total for the year to 74,247 tons, compared with 55,322 tons for the corresponding period in 1939. Pending business exceeds 22,500 tons.

Totonto, Ont.—Structural steel awards show some falling off, with awards totaling only about 3400 tons. No large orders were included, although a number of contracts ranging up to 350 tons were closed. Inquiries are holding well and several projects are under contemplation for which large tonnages will be required. Demand for structural in connection with war construction work is becoming more active and several thousand tons are pending.

Shape Contracts Placed

2511 tons, schedule 4032, Panama Canal, to United States Steel Export Co., Washington; bids May 13; also includes 68 tons plates and 24 tons bolts and washers.

2000 tons, office building, E. I. du Pont de Nemours & Co., Wilmington, Del., to American Bridge Co., Pittsburgh.

1500 tons, bridge, Dookers Hollow, Bessemer, Pa., for Allegheny county, to Pittsburgh Des Moines Steel Co., Pittsburgh.

1300 tons, bottling plant, Schaefer Brewing Co., Brooklyn, N. Y., to Bethlehem Steel Co., Bethlehem, Pa., through Turner Construction Co., New York.

1220 tons, gold dredge, South Platte Dredging Co., Colo., to American Bridge Co., Pittsburgh.

1000 tons, additional welded pots, for Aluminum Co. of America, Vancouver, Wash., to Puget Sound Machinery Depot, Seattle.

710 tons, Shelborne Hotel building, Hatfield Corp., Miami Beach, Fla., to Bethlehem Fabricators Inc., Bethlehem, Pa.

700 tons, steel piling, dike in Westfield river at West Springfield, Mass., to Carnegie-Illinois Steel Corp., Pittsburgh, through Whiteoak Excavators Inc., Plainville, Conn.

640 tons, Ford Motor Co. addition, Dallas ,Tex., plant, to Mosher Steel Co., Houston, Tex.

580 tons, addition to office and factory, for Vickers Inc., Detroit, to Austin Co., Cleveland.

555 tons, industrial buildings, air base, Jacksonville, Fla., to Ingalls Iron Works, Birmingham, Ala.

500 tons, state bridge, Croton Falls, N. Y., to Phoenix Bridge Co., Phoenixville, Pa.

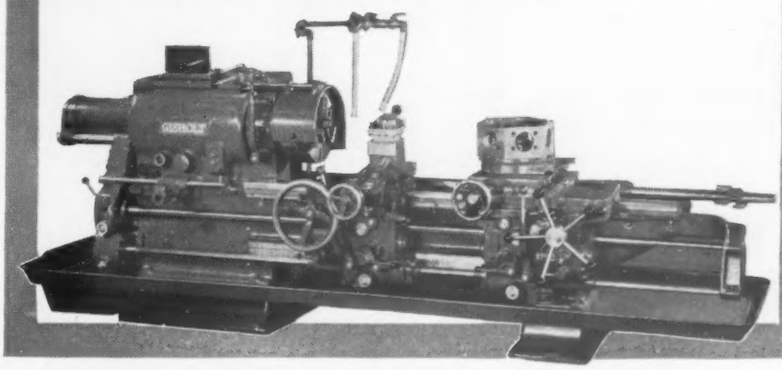
500 tons, heating and seat plate assembly, Grand Coulee dam, Odair, Wash., to Schmidt Steel Co.

460 tons, tunnel ribs, spec. 902, Lyons, Colo., to Colorado Fuel & Iron Corp., Denver.

450 tons, state highway bridge, Denver, Colo., to Midwest Steel & Iron Works Co., Denver.

450 tons, building No. 9, Lockheed Air-

52 LEADING MACHINE TOOL BUILDERS USE AMPCO METAL . . .



for EXTREME SERVICE PARTS

PROVIDING a stubborn resistance to breakage, deformation and wear, Ampco Metal does the job where other metals fail — in parts subject to heavy loading and requiring sustained accuracy — in difficult bearing, nut, gear, guide and insert services.

More and more machine tool builders are changing to Ampco Metal to secure the qualities they have long sought for extreme service bronze parts.

For the complete facts send for engineering data sheets and the Ampco Metal bulletin.

AMPCO METAL, INC., Dept. S-527, Milwaukee, Wisconsin

AMPCO METAL

"THE METAL WITHOUT AN EQUAL"

AMPCO

craft Corp., Burbank, Calif., to Bethlehem Steel Co., Los Angeles.

422 tons, including 65 tons of piling, Sand Creek bridge, Adams county, Colorado, to Midwest Steel & Iron Works, Denver, Colo.

350 tons, penstock coaster gates, specification 905, Grand Coulee dam project, Odair, Wash., to American Bridge Co., Pittsburgh.

350 tons, two double cantilever cranes for Friant dam, California, to Colby Steel & Engineering Co., Seattle.

350 tons, fertilizer plant for Eastern States Farmers' Exchange, Wilmington, Del., to Bethlehem Steel Co., Bethlehem, Pa.; J. A. Bater Co., Wilmington, general contractor.

345 tons, conveyor bridge, Aluminum Co. of America, Vancouver, Wash., to Bethlehem Steel Co., San Francisco.

250 tons, addition to plant, for North American Aviation Corp., Los Angeles, to Bethlehem Steel Co., Bethlehem, Pa.

236 tons, service station addition, New England Greyhound Lines Inc., South Boston, Mass., to American Bridge Co., Chicago.

220 tons, repairs to bridge, Walnut street, Elmira, N. Y., for city, to American Bridge Co., Pittsburgh.

190 tons, theater, Oswego, N. Y., to Buffalo Structural Steel Co., Buffalo.

190 tons, store building, Lerner Co., Pittsburgh, to Levinson Steel Co., Pittsburgh.

If you want to talk TANKS talk to FLEMING...

This maker turns them out so they stand up and stay tight

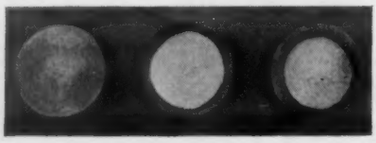
Unusual shape offers no obstacle to a tank builder of Fleming's long experience. This one, for example, is just as strongly and firmly constructed as those of more common design. Equipped with Monel tie-rods, it's Monel to pickling acid this tank will stay that way for a long, long time.

Above are a couple of sturdy looking pickling tanks typical of Fleming construction. One is for a tinplate mill, the other for a maker of enamel ware. But regardless of what they're used for, Fleming tanks are built to stay tight . . . held that way by rods, bolts and fittings that retain their strength because made of Monel.

It takes a long tank to handle lengths of structural steel . . . and a hefty one, too. The one at right is one of 3 built for that purpose by Fleming Tank Company of 3046 Pennsylvania Avenue, Pittsburgh, Pa. Designed to withstand abuse without springing leaks, it is fastened with Monel tie-rods. Fleming construction, Monel tie-rods . . . real assurance of long, trouble-free service from tanks.

Crates, baskets, chain and other pickling equipment are as readily made of Monel as are tie-rods. And because Monel is extra strong as well as extra resistant to corrosion, and makes strong, sound welds, such equipment does not have to be *heavy* to give long, satisfactory service. For further information on Monel for pickling equipment, write to:

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York, N. Y.



Cross-sectional view of three tie-rods after a 12-month test in well-known steel sheet mill. Monel (left) is uniform through its whole diameter. The other two rods, while still unchanged in diameter, are weakened by a change in their metal structure brought about by corrosion.

MONEL

"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

180 tons, addition to office building, for Interzone Corp., New York, to American Bridge Co., Pittsburgh.

175 tons, building, Brentwood, Pa., to Fort Pitt Bridge Works, Pittsburgh.

170 tons, store building, for Montgomery Ward & Co., Binghamton, N. Y., to American Bridge Co., Pittsburgh.

170 tons, state bridge 5337, Faribault, Minn., to Lakeside Bridge & Steel Co., Milwaukee.

170 tons, warehouses, army base, Tampa, Fla., to Virginia Bridge Co., Roanoke, Va.

165 tons, building, Seaman Body Corp., Milwaukee to Worden-Allen Co., Milwaukee.

160 tons, three hydraulic hoists, specification 905, Grand Coulee dam, Odair, Wash., to Consolidated Steel Corp., Los Angeles.

160 tons, bridge FAS-13E, Pushmataha county, Oklahoma, to Fort Smith Structural Steel Co., Fort Smith, Ark.

150 tons, bridge C1-74-79, Clermont county, Ohio, to American Bridge Co., Pittsburgh.

130 tons, addition public school 30, Staten Island, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.; Lynn Construction Co., New York, contractor; reported May 13 as reinforcing placed.

125 tons, bridge FAGS-505B (1) Oklahoma county, Oklahoma, to Capitol Steel & Iron Co., Oklahoma City, Okla.

120 tons, state bridge, Philadelphia road, Ohio, to Fort Pitt Bridge Works, Pittsburgh.

120 tons, court enclosure, for Fisher Body division, General Motors Corp., Flint, Mich., to Whitehead & Kales Co., Detroit.

110 tons, transmission towers, Darlington, R. I., to Lehigh Structural Steel Co., Allentown, Pa., Stone & Webster Inc., Boston, contractors.

105 tons, approximate, galvanized steel skeleton towers, Civil Aeronautics authority, Washington, various deliveries, to Emsco Derrick & Equipment Co., Houston, Tex., $27,517, pro. 399; bids April 25.

105 tons, store building, F. W. Woolworth Co., Taunton, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.

100 tons, addition, office building, Standard Oil Co. of New Jersey, Bayway, N. J., to B. Katchem Iron Works, Newark.

Unstated tonnage, signal bridges and electrical work, route 25, state of New Jersey, to Selbach-Meyer Co., West New York, N. J., $17,340; bids May 17, Trenton.

Shape Contracts Pending

3500 tons, Benjamin Franklin high school, New York; bids being taken.

2000 tons, Cardinal Hayes Memorial high school, Bronx; George A. Fuller Co., New York, contractor.

1400 tons, apartment, Tishman Realty Co., Eighth avenue and Eighth street, New York.

1250 tons, trusses and stringer bridge and approaches, Hoosic river, North Adams, Mass.; Carlo Bianchi & Co. Inc., Framingham, Mass., low, bids May 21, Boston.

1200 tons, state bridges, New York, bids June 12, Albany, N. Y.

1000 tons, warehouse, for American

Stores Co., Kearny, N. J.

757 tons, two overcrossings, Rock Springs, Sweetwater county, Wyo.

750 tons, plant at Centerville, Calif., Leslie Salt Co.

700 tons, grade separation bridge, Detroit, for state.

595 tons, bridge at Red Cliff, Eagle county, Colo.

570 tons, beam spans, various locations, for Great Northern railway.

465 tons, including 200 tons steel sheet piling, state highway bridge, Forest and Clarion counties, Pennsylvania; bids to state highway department, Harrisburg, Pa., May 31.

454 tons, warehouse, Chicago, Sears, Roebuck & Co. Previously estimated at 500 tons.

453 tons, overhead crossing, Union Pacific railroad, Rock Springs, Wyo.

440 tons, coal bunker, etc., for West Penn Power Co., Power, W. Va.

440 tons, extension to craneway, for Yellow Truck & Coach Mfg. Co., Pontiac, Mich.

400 tons, powerhouse, Hutsonville, Ill., Central Illinois Public Service, Springfield, Ill.

355 tons, four bridges, route 29, sections 1B and 1C, Hillside and Union townships, New Jersey; bids June 7 to E. Donald Sterner, state highway commissioner, Trenton; work involves three underpasses and widening existing bridge over Elizabeth river.

300 tons, ice rink, Berkeley, Calif.; general contract to W. A. Bechtel & Co., 155 Sansome street, San Francisco.

300 tons, bridge 367, Forge road, Providence, R. I., for state.

300 tons, garage addition to Brost Motors Inc., Buffalo.

220 tons, apartment building, for Ambler Park Terrace, Cleveland.

205 tons, two through-plate girder spans, public roads administration, Cody, Wyo.

180 tons, Kanapolis, Kans., dam, Morrison & Knudsen, Boise, Idaho, low on general contract.

175 tons, relocation project, including overpass and approaches, Pennsylvania-Reading Seashore Line, South Dennis, Cape May county, N. J., route 49, section 16; bids June 7 to E. Donald Sterner, state highway commissioner, Trenton.

170 tons, building, for Fanny Farmer Candy Shops Inc., Detroit.

170 tons, building, for Florence Oil Stove Co., Gardner, Mass.

150 tons, warehouse, garage, etc., Alaska, for United States government.

150 tons, state bridge, Hardwick, Mass.

150 tons, hospital building, Salem, Mass.

144 tons, trash racks for penstock intakes, Wheeler dam, units 3 and 4, bids June 3, Tennessee Valley authority, Knoxville, Tenn.

140 tons, recreation building, Loyola high school, Baltimore.

140 tons, factory building, for I-Sekina Co., Baltimore.

131 tons, warehouse, garage and maintenance building, cold weather experimental station, Fairbanks, Alaska.

120 tons, state bridge over Milk river, Zurich, Mont.

120 tons, additions to office and factory, for Haughton Elevator Co., Toledo, O.

120 tons, new floor in building 12, Philadelphia navy yard, for navy.

108 tons, state highway work, Allegheny county, Pennsylvania; bids to state highway department, Harrisburg, Pa., May 31.

105 tons, bridge over North Fork river, Zurich, Mont.

100 tons, control house, for Sun Oil Co., Marcus Hook, Pa.

100 tons, building, for Detroit Wax Paper Co., River Rouge, Mich.

100 tons, additions to building, for Electro-Motive Corp., La Grange, Ill.

100 tons, recreation hall, Lehigh University, Bethlehem, Pa.; bids June 3.

Unstated tonnage, 175,950 square feet steel sheet piling, improvements to locks and dams. Nos. 11, 16, 18, 20 and 21, in Mississippi river; indefinitely postponed.

Reinforcing

Reinforcing Bar Prices, Page 85

Pittsburgh—Market is fairly active, with both public and private projects contributing prominently to tonnages. Due to rapidly increasing demand, prices have risen in eastern markets. Eastern prices are at 1.70c and above, but not yet back to 2.15c, the nominal published level.

Chicago — Numerous small jobs,

For years Koppel engineers have been studying and analyzing the waste disposal problems of steel mills and have successfully furnished many units for this type of service. Outstanding today are *two* types of Koppel Cars that ideally provide the required speed, capacity, ease of operation,—at lower cost.

KOPPEL

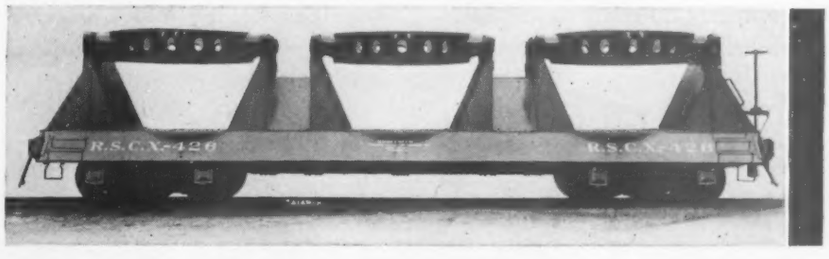
(1) Fifty (50) Yard Air Dump Cars—designed for general waste disposal, providing almost twice the capacity of previous cars,—now being used most successfully in several of the leading mills.

(2) Triple Cinder Ladle Cars—for handling waste from open hearths. Designed to utilize available ladle equipment,—so constructed that large chunks of very hot material can be handled easily and without damage.

May we submit some interesting cost figures for your consideration?

PRESSED STEEL CAR COMPANY, INC.

(KOPPEL DIVISION)—PITTSBURGH, PA.



mostly private, continue to come out. Prices show a firmer trend. Improved demand is reported for unidentified projects, while pending tonnage for construction here and in surrounding territory is substantially unchanged.

New York—Except for highway reinforcing, buying has slumped, most larger projects recently estimated having been placed. Close to 1000 tons of mesh for upstate New York highways has been bought. Bids are in on a housing project, Elizabeth, N. J. which coupled with a similar job at Jersey City involves close to 1600 tons. Concrete bar prices, billet and re-rolled, continue mixed and weak.

Boston—In addition to 650 tons of road mats for highway reinforcing, Connecticut, bids close June 3 at Hartford on close to 200 tons, one contract taking 165 tons. Inquiry continues to mount slowly with prospective tonnage for industrial expansions gaining. Bridge needs are more numerous, but few large tonnages are involved.

Seattle—Demand has improved materially, following three months of inactivity. New projects are coming out, including 180 tons for the Swift packing plant, Seattle, and unstated tonnage for a school at Yakima, Wash., extension of Sand Point barracks and work at the Puget Sound navy yard. Bethlehem Steel Co., Seattle, has booked 2000 tons for the naval air bases at Kodiak and Sitka, Alaska, and 260 tons for the Florence hotel, Missoula, Mont. Reclamation bureau has placed 1270 tons with the same producer for delivery at Coulee dam.

San Francisco—While awards for reinforcing bars were not heavy, more than 25,500 tons is pending. Awards totaled 2293 tons and brought the aggregate to date to 58,675 tons, compared with 75,558 tons for the same period last year.

Toronto, Ont.—Reinforcing steel awards for the week mostly were in lots under 200 tons with total around 1400 tons. New demand slowed down during the past week or ten days, although several thousand tons are pending.

Reinforcing Steel Awards

2000 tons, naval air bases at Sitka and Kodiak, Alaska, to Bethlehem Steel Co., Seattle; Siems, Drake, Puget Sound, Seattle, general contractor.

1500 tons, addition for Campbell Soup Co., Camden, N. J., to Concrete Steel Co., New York; through Thomas F. Gibson, Philadelphia, contractor; also includes 126 tons shapes.

1268 tons, bureau of reclamation, invitation B-38,232-A, Odair, Wash., to Bethlehem Steel Co., Seattle, Wash.

825 tons, mesh, state highway projects, Hamilton, Franklin, Clinton and Warren counties, New York, to Truscon Steel Co., Youngstown, O.; Louis Mayersohn, Albany, N. Y., general contractor.

570 tons, Nimrod dam, United States engineers, Ola, Ark., to Sheffield Steel Corp., Kansas City.

435 tons, overpass, Missouri Pacific railroad, St. Louis, to Laclede Steel Co., St. Louis.

321 tons, bureau of reclamation, invitation, B-46,196-A, Kremling, Colo., to Colorado Fuel & Iron Corp., Pueblo, Colo.

260 tons, Florence Hotel, Missoula, Mont., to Bethlehem Steel Co., Seattle; Allo-

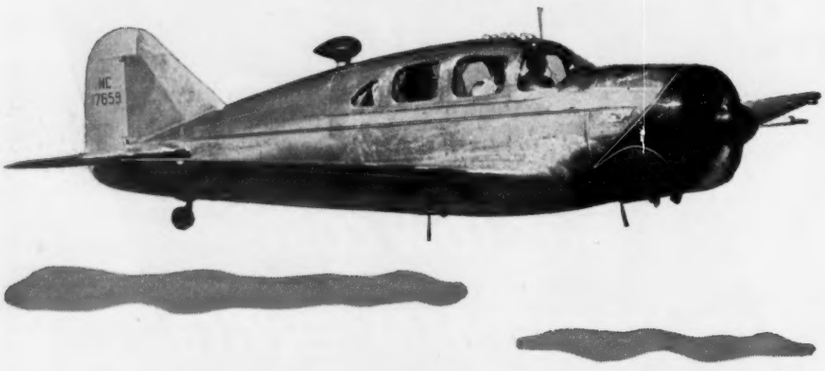
Concrete Bars Compared

	Tons
Week ended May 25.....	7,899
Week ended May 18.....	10,647
Week ended May 11.....	7,945
This week, 1939	11,360
Weekly average, year, 1940	8,179
Weekly average, 1939	9,197
Weekly average, April . ..	9,875
Total to date, 1939.....	223,109
Total to date, 1940.....	171,753

Includes awards of 100 tons or more.

THE SWING'S TO

STAINLESS!



• From drawing-board to airplane production lines in a few years is the record of stainless steel. Such advantages as light weight, strength, rigidity, resistance to heat and corrosion put it there. Now aircraft manufacturers know another important reason:

IT'S GOOD DOLLARS AND CENTS BUSINESS

With Armco Stainless Steel, you can use the fast spot-welding process. Heat treatments and slow riveting methods are out. This means swifter production, lower costs and opportunities for more flexible design.

You may not build aircraft or airplane parts, but there's a good chance you can cut costs and make more money by using Armco Stainless Steels. These rustless metals draw and form readily, polish easily and have excellent welding properties. In fact you'll be delighted to know how many new selling points your products can boast.

Why not try Armco Stainless Steel on that next order? Or if you would like more information about this durable metal, just write The American Rolling Mill Company, 1770 Curtis St., Middletown, Ohio.

ARMCO STAINLESS STEELS

way & Georg, Spokane, general contractors.

247 tons, bureau of reclamation, invitation 30,799-A, La Pine, Oreg., to Judson Steel Corp., San Francisco.

198 tons, Santa Fe railroad bridge, Chicago, to Inland Steel Co., Chicago.

175 tons, building, Armstrong Rubber Co., West Haven, Conn., to Topper & Griggs, Hartford, bars to be supplied by Bethlehem Steel Co., Bethlehem, Pa.; Edwin Moss & Son, Bridgeport, contractor.

100 tons, hangar, Chanute field, Rantoul, Ill., to Laclede Steel Co., St. Louis.

Reinforcing Steel Pending

2900 tons, store house, specification 9686, naval air base, Alameda, Calif.; bids opened.

2400 tons, warehouse, Goldblatt Bros. department stores, Chicago.

1250 tons, improvements to locks and dams Nos. 11, 16, 18, 20 and 21 in Mississippi river; indefinitely postponed.

1000 tons, Kanapolis, Kan., dam, Morrison & Knudsen, Boise, Idaho, low on general contract.

650 tons, housing project, Elizabeth, N. J.; bids in.

550 tons, Cottage Grove dam, Lane county, Oregon; bids June 14.

350 tons, truss and stringer bridge, Hoosic river, North Adams, Mass.; Carlo Bianchi & Co. Inc., Framingham, Mass., low, bids May 21, Boston.

230 tons, telephone exchange building, Rogers Park, Ill.

214 tons, two over-crossings, Rock Springs, Sweetwater county, Wyo., for state; bids opened.

208 tons, library, state college, San Jose, Calif.; bids opened.

200 tons, filtration plant, Bridgeport, Conn.

185 tons, Panama, schedule 4056; bids May 31, Washington.

185 tons, mostly bars, shapes and piling, Jones Ferry pumping station, Connecticut river, Chicopee, Mass.; bids June 6, United States engineer, Providence, R. I.

180 tons, Swift & Co. packing plant, Seattle; bids at Chicago, June 3.

178 tons, mesh and bars, relocation highway project, including overpass and approaches over Pennsylvania-Reading Seashore Lines, South Dennis, N. J.; bids June 7 to E. Donald Sterner, state highway commissioner, Trenton.

165 tons, highway mesh, state projects, Norfolk, Colebrook and Winchester, Conn.; bids June 3, Hartford.

152 tons, three bridges in Yuba and Butte counties, California, for state; bids June 5.

150 tons, undercrossing, Fair Oaks avenue, Los Angeles, for state; bids June 6.

150 tons, warehouse buildings, Westover field army air base, Chicopee, Mass.

145 tons, sewer contract 2, Flushing, N. Y., Charles Bennett Co. Inc., Brooklyn, contractor.

140 tons, state highway work, Allegheny county, Pennsylvania; bids to state highway department, Harrisburg, Pa., May 31.

100 tons, three underpasses and Elizabeth river bridge widening, Hillside and Union townships, New Jersey; bids June 7 to E. Donald Sterner, state highway commissioner, Trenton.

Pig Iron

Pig Iron Prices, Page 86

Pittsburgh — Production is increasing substantially, but buying has not appeared in any volume in the merchant market. Prices are stronger, with most sellers reporting business at full prices. By-product coke activity is at a peak, but beehive coke prices disclose no stronger tone. Foundry activity is fair, with some steel foundries operating close to capacity. Railroad suppliers are busy, roll shops are rushed and jobbing steel foundries report inquiries good.

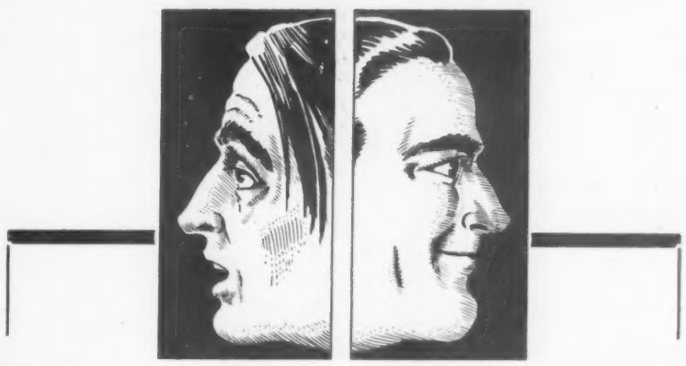
Cleveland—Buying has improved markedly the past week to ten days. Many consumers have worked down stocks, and the prospect of quickened industrial activity and better engagement of iron and steel plants is prompting renewed purchasing. Recent demand along the Great Lakes is estimated to have involved 150,000 to 200,000 tons. Foundry operations have varied little so far this month.

Chicago — A new buying move-

TRUFLO FANS

contribute

BETTER AIR TO INDUSTRY



FATIGUED WORKER

Hot, stagnant, stale air saps his vitality, slows him up

ENERGETIC WORKER

Fresh, cool, circulating air keeps him alert and fit

Proper ventilation and cooling is as necessary to plant and factory workers as proper food and rest. Acid and oil fumes, smoke, dust and heat make a willing worker a slow worker. TRUFLO FANS make him an efficient worker by cooling his body and clearing his lungs. There is a TRUFLO FAN for every requirement—PORTABLES for the vicinity of skelp and heat-treating furnaces; crane cabs, pent house fans for oil and paint shops, pickling plants, etc. TRUFLO FANS are solid, sturdy, dependable. The wheel is cast in a single piece from high tensile strength aluminum alloy. It is light and perfectly balanced, relieving the motor shaft of excessive weight. TRUFLO FANS make cooler and better atmosphere. Write for Bulletin.

TRUFLO FAN CO.

600 Mercer Street

HARMONY, PA. (PITTSBURGH DISTRICT) PHONE ZELIENOPLE 293

ment is under way, as actual sales have increased considerably and many consumers are ordering far ahead. Price is firm at $23. Last few days of last week buying was noticeably better, but the movement lacks the briskness of last fall. It is understood considerable third quarter tonnage is being booked and, in some cases, fourth quarter. Iron shipments are improved, but do not compare with the gains in buying.

Boston — Pig iron buying is slightly heavier, with individual orders larger in some instances. Some export inquiry is noted, but little business has apparently been closed in this district. Shipments are well maintained against orders. Foundry melt is gradually mounting with prospects for heavier schedules at more plants likely with development of the rearmament program.

Philadelphia — Activity in pig iron has picked up sharply, with incoming tonnage largest since last fall. Several lots ranging up to 500 tons have been reported closed recently. Largest single lot was 1500 tons of malleable. Some talk is heard of a further price advance, but this is not believed likely at the moment. Some export business is reported although total volume now is off due to closing of the Swedish market.

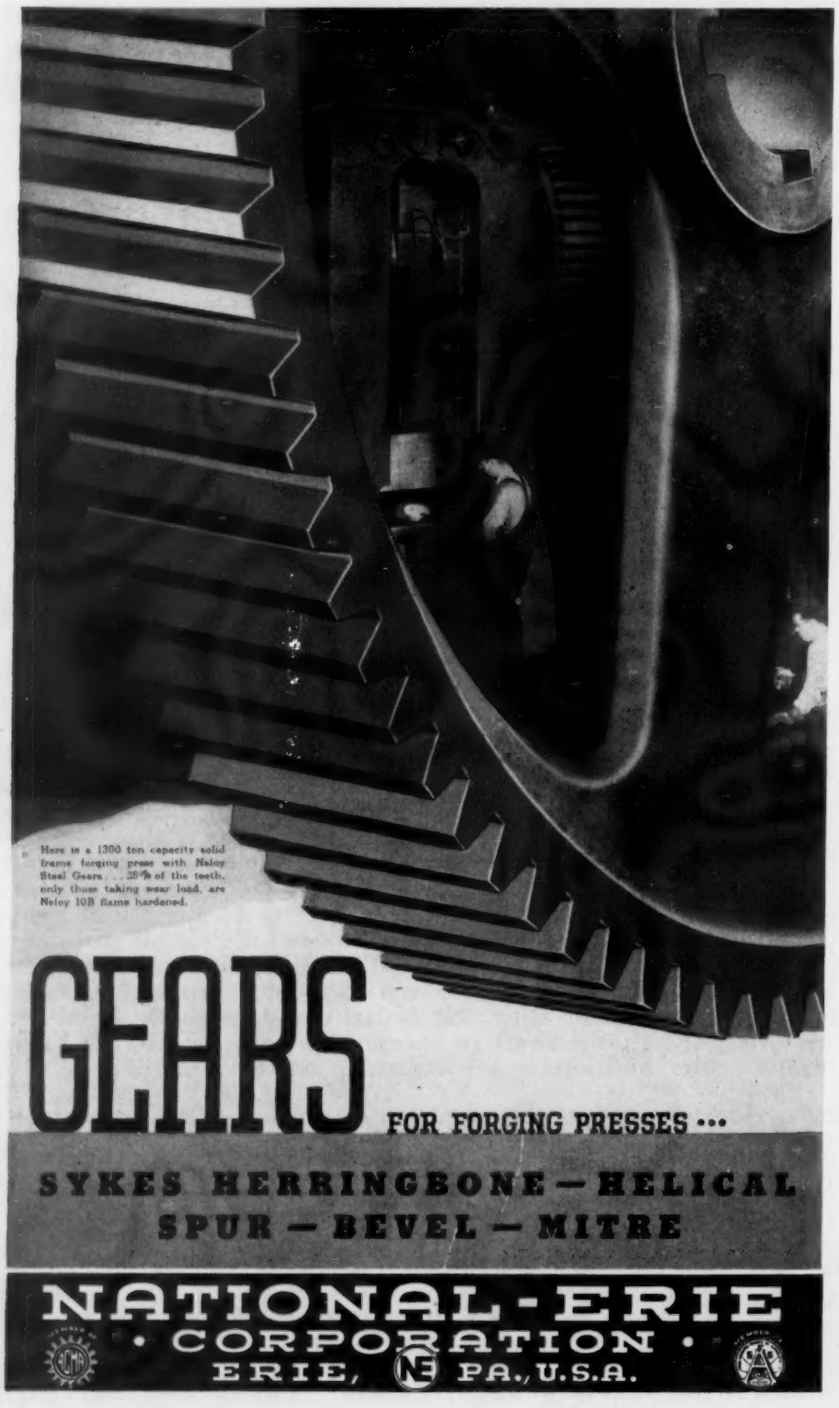
New York — Business has improved appreciably, although the melt has not increased greatly. Demand is stimulated by the rising trend in scrap prices, the possibility of further gains in steel production and the fact many contracts are becoming depleted .

Buffalo — Business has experienced a pronounced flurry, large consumers in particular being anxious to enter orders and showing little concern over prices. More interest also is being displayed in deliveries. Shipments are heavier.

Cincinnati—Consumers are showing more interest in third quarter pig iron, preceding announcemet of prices or opening of books for that period. Specifications are fairly steady, although a better melt among jobbing and stove foundries is in prospect. Movement of foundry coke is sustained.

St. Louis — Last week saw a revival of forward buying of pig iron. Melters had allowed their stocks to be reduced, and with better business on books and expectations of further improvement, substantial tonnages had been purchased.

Toronto, Ont.—Pig iron demand continues steady, but lacks special feature. Most current business is for spot delivery and inquiries are appearing for third quarter. Producers are giving good delivery on spot sales and melters mostly are satisfied to place orders as demands dictate.


Here is a 1300 ton capacity solid frame forging press with Naloy Steel Gears . . . 28% of the teeth, only those taking wear load, are Naloy 10B flame hardened.
GEARS
FOR FORGING PRESSES •••
SYKES HERRINGBONE — HELICAL
SPUR — BEVEL — MITRE
NATIONAL-ERIE
• CORPORATION •
ERIE, PA., U.S.A.

Scrap

Scrap Prices, Page 88

Pittsburgh — Scrap markets over the past week have risen 50 cents on most items, largely out of sympathy with broker activity. A few scattered sales have been made at or above current quotations but quantities have been small and quantity buying appears as far off as ever. Short sales have virtually disappeared because of the difficulty involved in covering at any price, and most current quotations are largely nominal.

Cleveland—Scrap is quiet in this market, low phos punchings for electric furnace use advancing 50 cents per ton, the only activity in prices. Two cargoes of miscellaneous scrap were unloaded last week.

Chicago—Scrap remains firm but with prices substantially unchanged. Limited amount of mill buying has been confirmed at $17.50 for No. 1

heavy melting steel, though dealer-broker trading of this grade continues to indicate a higher value. Dealers are selling within a range of $17.25 to $17.50.

Boston — Stronger iron and steel scrap prices are accompanied by better domestic demand and heavier ship loading for export. For dock delivery, heavy melting steel grades have been advanced 50 cents while for domestic consumption, machine shop turnings, busheling, and most cast grades are up 50 cents or more a ton. Steelmaking grades have also moved up $1 a ton for shipment to New England consumers.

New York—Advances of 50 cents or more are effective on numerous grades, including heavy melting steel for domestic and export shipment, $14.50 being paid by brokers for the latter. Increased shipments to eastern Pennsylvania are noted but tonnage from this district is relatively light. Foundries are buying at slightly increased pace but are well stocked. Barge accumulations for export are about 15,000 tons, not considered excessive.

Philadelphia — Eastern scrap market now is caught in a strong upsurge, with brokers, in many instances, paying prices above present consumer market for the purpose of covering against old orders. No. 1 steel now is quoted at $18.50 on the basis of sales in the past few days, but brokers already are paying this figure to cover. Practically the entire list is sharing in the rise.

Buffalo—Supported by small undercover sales among dealers, the price upturn on steelmaking grades of scrap has been extended another 50 cents, making a gain of $1 a ton for the week.

Detroit—Scrap markets show continued strength with further increases registered in loose clippings and several foundry grades. A tonnage of heavy breakable cast has been sold well above the price prevailing for the past week, although special considerations may have been involved as far as size was concerned.

Cincinnati—Scrap prices are up 50 cents, which places heavy melting steel at $13.75 to $14.25, or slightly under the best level obtained recently on small-lot sales. Part of the recent rise had support from consumer demand, but in the main this has been a dealer market and influenced not a little by war conditions.

St. Louis — Prices have advanced 50 cents to $3.75 a ton, influenced more by increasing prices in other markets than by any tendency to buy here. No deals are pending at present with district mills since they are well fortified and are not inclined to buy except at prices dealers are unwilling to accept.

Toronto, Ont. — Interest in the scrap market is expanding. Consumers show more interest and are placing orders for all the materials they can obtain. In addition to the big tonnages being supplied by Canadian dealers, imports running between 15,000 and 20,000 tons monthly are reported from the United States. Canadian mills are taking all offerings of steel scrap

San Francisco — Movement of scrap continues limited and local steel producers are buying only for replacement. Export business is at a standstill. No. 1 heavy melting steel, f.o.b. cars, metropolitan districts, Los Angeles and San Francisco, continue at $11.50 to $12 a net ton, with No. 2 at $10.50 to $11. No change in compressed sheets or turnings and borings has occurred. Dealers buying prices on No. 1 heavy melting steel continue at $8.50 to $9.

Birmingham, Ala. — Scrap continues to show renewed activity. Inventories seem to be ample.

HIGH CARBON COLD ROLLED STRIP STEEL

Many shipments of high carbon Thomastrip go to manufacturers of assembly parts that require difficult formations and must be heat treated for the development of superior physical properties. Proper steel analysis is vital to attain the exacting specifications for such high quality needs. The steel must be cold rolled and annealed with extreme care to give fabricating operations every possible advantage. Uniformity of grain structure is essential to best results from heat treatment.

Let us know your needs for those qualities in cold rolled strip steel where the use of high carbon steel offers the best solution.

BRIGHT FINISH UNCOATED AND ELECTRO COATED WITH NICKEL, BRASS, COPPER, BRONZE, ZINC, AND TIN

SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

THE THOMAS STEEL CO.
WARREN, OHIO

Behind the Scenes with STEEL

Service With A Smile

■ We've always labored under the fearful misapprehension that it would cost you a cool twenty-five bucks for a flat tire or an empty gas tank in those two great underwater bridges, the Holland and Lincoln tunnels. Now from Billings Wilson, assistant general manager of the Port of N. Y. Authority comes the soothing explanation that a 24-hour emergency service is constantly on hand at both trans-Hudson tunnels to render every conceivable type of first aid to ailing autos. Of course, they won't grind the valves or adjust your brakes, but you can be towed to the nearest service station cheerfully and without charge.

Rebuttal

■ We knew Chicago editor Jim Powell wouldn't take that hair growing crack last week lying down. He writes: "My silken tresses began dropping like parachute troops behind the Maginot line. This was first called to my attention by no one other than Shorty Long. 'Yessir,' Shorty says, between chaws of Clabber Girl, 'Your head shines like them new rolls we got on the three-high.' This was too much for me, so I determined to find a method that would grow hair even on billiard balls. This was easier than expected, as attested by my collection of some three-dozen fur-bearing eight balls, which I am no longer behind. It was not until I found Nu-Glu, however, that my hair began to grow like blue grass in Kentucky. An interesting sidelight is that for years I also had been stone deaf, but after taking 194 bottles of Nu-Glu, accompanied by small amounts of ginger ale, the next day I heard from my uncle in India."

Heckler

■ We have an anonymous subscriber down in Pittsburgh whose orange juice must be sour and shredded wheat biscuits tough every once in a while on Monday mornings as he reads STEEL in the coffee shop of the William Penn. Not long ago we ran a puzzle about the fly and the bicycle and it came smack back to us with a pointed note reading: *You just go to h——!* This week he writes: *Please quit casting any of your —— aspersions on A. H. Allen of Mirrors of Motordom. He is tops. But keep on with your column. The world is rapidly coming over to your (crazy) side.* Yeh?—then we're leavin'!

Parlor Game

■ Move one match last week and you have the square of one equals one. H. E. Frederickson saved the day on the May 13 boat and ladder puzzler with the simple explanation that boats at anchor usually float, which sounds very logical. Try this on your friends: Multiply your age by 2. Add the number of toes on your right foot. Multiply by 50. Add the amount of change under one dollar in your pocket. Add the number of toes on your left foot and subtract the number of days in a year (365). Add 110 and the first two figures in the answer are your age; the last two the amount of change in your pocket. (Note: Don't try it on any guy who had his big toe cut off with a niblick.)

Heaven

■ The E. Ingraham Co., Bristol, Conn., has developed their lobby into a veritable salesmen's paradise. Well furnished in large overstuffed yellow leather chairs, a radio brings latest news reports, ball games or soft music. A writing desk contains air mail and regular stamped envelopes, engraved letterheads, pen and ink and an ample collection of daily newspapers. Even the men's room off the lobby is finished in pink tile with very fancy indirect lighting. W. O. Warner, P. A., says they want to keep everyone happy whether they get an order or not.

SHRDLU

—The Market Week—

Warehouse

Warehouse Prices, Page 87

Pittsburgh — Business has increased less rapidly than is suggested by heavier orders from warehouses who are enlarging their stocks. However, inquiries point to further improvement. Prices are fairly steady.

Chicago — Orders are slightly heavier, but the month's total is thought unlikely to better the April tonnage by more than 5 per cent. A small upward tendency is in prospect the next 30 days.

New York — With demand well spread as to products, volume with warehouses thus far this month closely parallels April. Prices are unchanged and generally firmer, although confusion continues in galvanized sheets, aggregate stocks of which held by secondary consumers are still large. Demand for stainless and alloy bars is notable, much the result of government shop work or contracts.

Philadelphia — Warehouse business is running ahead of April but is not keeping pace with the rise in mill bookings. Prices are a shade steadier.

Buffalo — Warehouses express some surprise over failure of sales to reflect the upturn in mill operations.

Cincinnati — Warehouse sales have broadened, and May apparently will show a moderate increase over April. Prices on hot-rolled sheets and strip were adjusted upward.

Seattle—Volume is fair, having dropped slightly this week due to labor difficulties in the metal trades industries. Out of stock goods are showing seasonal turnover, only occasional car lots being placed. Prices are firm at present levels.

Iron Ore

Iron Ore Prices, Page 88

Cleveland — April consumption of Lake Superior iron ore totaled 3,934,853 gross tons, against 4,087,767 tons in March and 2,799,769 tons a year ago, according to the Lake Superior Iron Ore association. Consumption the first four months this year was 17,553,767 tons, against 11,895,706 tons a year ago.

Stocks at furnaces and on Lake Erie docks on May 1 were almost 21 per cent less than a year ago. Comparisons follow:

Gross Tons Iron Ore on Hand

	At Furnaces	On Lake Erie Docks	Total
May 1 1940	15,155,399	2,950,752	18,106,151
Month Ago	18,411,970	3,450,332	21,862,302
Year Ago	18,305,966	4,484,967	22,790,933

Steel in Europe

Foreign Steel Prices, Page 87

London—(*By Cable*)—Supplies of steel from Belgium and Luxemburg to Great Britain have been stopped and orders have been diverted to Canada and the United States. Recent arrivals from the Continent have been satisfactory but the present interruption is detrimental to British production.

Arrangements have been made with labor to intensify production for increasing war needs. Most Belgian iron and steel plants are in the war zone and some French production is also stopped. Export trade by Continental producers is disrupted and French and British available tonnage is extremely restricted. No export quotations on Continental steel are available.

Tin Plate

Tin Plate Prices, Page 84

Pittsburgh—Tin mill operations are up to 71 per cent of capacity, following larger releases from can makers. Export markets continue to expand, and reports indicate added demand for export of materials packed in cans. Local mills are building up stocks somewhat, the increase coming partially from that source. However, stocks are reported to be in good shape to carry the expected increase. Producers here see little possibility of additional mills being called into operation unless some unforeseen demand comes into the picture.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 85

Business this month has been more active than in April, reflecting better requirements from the building construction field primarily. Shipyard releases also are better although railroad requirements have been sluggish and automotive requirements are down slightly. The latter has held up better than was expected.

Nonferrous Metals

New York—European war developments continued to exert considerable influence on domestic nonferrous metal markets last week. Buying generally was on a smaller scale, pending outcome of the present phase of the war, while prices showed no definite trend. The 25-point advance in zinc on Friday was the outstanding development. For-

Nonferrous Metal Prices

May	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
18	11.50	11.50	11.12½	54.00	51.50	5.00	4.85	5.75	19.00	14.00	35.00
20	11.50	11.50	11.12½	54.00	51.00	5.00	4.85	5.75	19.00	14.00	35.00
21	*11.25	11.50	11.12½	54.00	50.87½	5.00	4.85	5.75	19.00	14.00	35.00
22	*11.25	11.50	11.00	53.87½	50.87½	5.00	4.85	5.75	19.00	14.00	35.00
23	*11.25	11.50	11.00	53.50	50.50	5.00	4.85	5.75	19.00	14.00	35.00
24	*11.25	11.50	11.00	53.00	50.00	5.00	4.85	6.00	19.00	14.00	35.00

*Based on sales by custom smelters; mine producers unchanged at 11.50c.

MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 11.50c Conn. copper

Sheets

Yellow brass (high)	18.31
Copper, hot rolled	20.12
Lead, cut to jobbers	8.25
Zinc, 100 lb. base	11.00

Tubes

High yellow brass	21.06
Seamless copper	20.62

Rods

High yellow brass	13.26
Copper, hot rolled	16.62

Anodes

Copper, untrimmed	17.37

Wire

Yellow brass (high)	18.56

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	6.87½-7.12½
Cleveland	8.00-8.25
Chicago	7.50-7.75
St. Louis	7.75-8.25

Heavy Copper and Wire

New York, No. 1	8.50-8.75
Cleveland, No. 1	9.00-9.25
Chicago, No. 1	8.75-9.00
St. Louis	8.75-9.25

Composition Brass Turnings

New York	6.50-6.75

Light Copper

New York	6.50-6.75
Cleveland	7.00-7.25
Chicago	6.75-7.00
St. Louis	6.75-7.00

Light Brass

Cleveland	3.50-3.75
Chicago	4.25-4.50
St. Louis	4.25-4.50

Lead

New York	4.50-4.75
Cleveland	3.90-4.15
Chicago	3.90-4.10
St. Louis	4.00-4.25

Zinc

New York	3.00-3.25
Cleveland	2.75-3.00
St. Louis	3.25-3.50

Aluminum

Misc., cast, Cleveland	8.00
Borings, Cleveland	6.50
Clips, soft, Cleveland	14.00
Misc. cast, St. Louis	7.75-8.00

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads	12.00
Standard No. 12 aluminum	13.75-14.00

UNIVERSALLY ACCEPTED

Among leading users in structural, railroad and boiler shops, shipbuilding and industrial plants, for over 65 years Hannifin "Allen" pneumatic riveters have offered smooth-acting, efficient performance, with a type and size to meet every need. Built in Jaw, Compression Lever, Lattice, and Alligator types, capacities for structural rivets from ⅜ in. to 1¼ in. Both portable and stationary pneumatic types and the Hannifin "Allen" hydraulic jaw riveter cover the full range of riveting requirements. Write for Bulletin No. 43 with complete data on all types.

HANNIFIN MANUFACTURING COMPANY
(ALLEN RIVETER DIVISION)
621-631 South Kolmar Avenue • Chicago, Illinois
WORLD'S LARGEST MANUFACTURERS OF SQUEEZE RIVETERS

eign silver advanced ½-cent to the basis of 35.25c an ounce, New York, following the British ban on exports and increased demand here from foreign countries.

Copper—Electrolytic prices fluctuated rather rapidly with the close quoted 11.50c, Connecticut, by mine producers; 11.25c by custom smelters and resellers; and 11.25c, f.a.s. New York, by exporters. Although the export market has shrunk, France is expected to purchase 50,000 tons or more during the next two weeks unless she meets further serious reverses.

Lead — Prices held unchanged throughout the week on the basis of 4.85c, East St. Louis, and 5.00c, New York. Sales tapered to a moderate level due to consumers' well covered position but are expected to pickup when July books are opened around May 27.

Tin—Due to uncertainty regarding the future of Netherlands East Indies, demand increased in all leading markets. Prices generally were higher with Straits spot closing at 53.00c, New York.

Zinc—Sellers raised prices ¼-cent a pound on Friday to the basis of 6.00c, East St. Louis, for prime western. This followed a period of prolonged strength and fairly heavy sales which aggregated about 23,000 tons during the past three weeks. Belgium, one of the world's largest producers, will no longer be able to supply her former customers who generally will turn to the United States during the duration of the war.

Antimony — Consumers again placed only routine business on the basis of 14.00c, New York, for American spot in cases. Chinese spot held nominally unchanged on the basis of 16.50c, duty paid New York.

Ferroalloys

Ferroalloy Prices, Page 86

New York—Ferromanganese shipments in May will be the largest since last fall, although not comparable to the peak movement at that time. In addition to heavier demand for steelmaking, prices appear likely to advance when books are opened in mid-June for third quarter. An earlier increase on spot shipments would not be surprising.

Construction and Enterprise

Ohio

ANDOVER, O.—Plans have been made by E. J. Edwards, company engineer, Nela Park, Cleveland, for a building for General Electric Co. at Andover for manufacture of glass containers for light bulbs. Site has been bought at Maple street and New York Central railroad.

CLEVELAND—Harshaw Chemical Co., 1000 Harvard avenue, is building a plant addition to double production of fluoride products. Structure will be two stories, 60 x 70 feet, brick and steel, costing about $17,000.

CLEVELAND—National Fixtures Mfg. Co. Inc., 2608 East Ninth street, manufacturer of barbecue machines and similar equipment, has leased two floors at 1600 Woodland avenue and will install manufacturing equipment. A. J. Litt, 505 Public Square building, is president and treasurer.

CLEVELAND—Otis Steel Co. will rebuild a blast furnace at Riverside plant, at cost of about $200,000.

CLEVELAND—L. C. N. Corp. has been incorporated with $100,000 by Clyde E. Hovis, 2013 Athens avenue, Lakewood, Ohio., to manufacture automotive, locomotive and steamship parts.

CLEVELAND—Lees-Bradner Co., tool manufacturer, 6210 Carnegie avenue, has leased plant of Smith Incubator Co., Elmwood avenue and West 121st street and will move operations there soon. H. T. Bradner is president. Plant has 62,000 square feet floor space on four acre site. Overhead craneway will be added.

CLEVELAND—United Screw & Bolt Corp., Cleveland division, 3590 West Fifty-eighth street, is building addition for storage space, costing about $7000.

LORAIN, O.—National Tube Co., Pittsburgh, subsidiary of United States Steel Corp., will build additional blast furnace at plant here, with sintering plant to reclaim flue dust, at total cost of about $2,000,000.

MANSFIELD, O.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will build another plant building and an addition to an existing structure, with installation of new equipment at plant here, costing about $500,000. C. L. Vandereau is plant manager.

NAVARRE, O.—Nickels Baker Inc. is having plans made for second addition, including new boiler plant and other units, 50 x 70 feet two stories and 60 x 60 feet one story. W. E. Long Co., 155 North Clark street, Chicago, is engineer.

SIDNEY, O.—Monarch Machine Tool Co., Wendell E. Whipp, president, has authorized addition of 20,000 square feet to increase manufacturing capacity 15 per cent. New equipment costing about $200,000 will be installed.

TOLEDO, O.—City Auto Stamping Co. has bought a ten-acre site for its proposed $500,000 plant. (Noted May 6).

WADSWORTH, O.—R. S. Ringer and Owen Ringer, Route 224, west of Wadsworth, plan refrigerated locker plant, containing large freezing room and individual lockers for rent.

WARREN, O.—Mullins Mfg. Corp., University street, will build two steel additions, for furnace building and storage, 40 x 80 and 60 x 90 feet. Bids will be taken soon.

FLUOR-SPAR

Guaranteed 85% plus in Calcium Fluoride Not to exceed 5% silica In bulk

HILLSIDE FLUOR SPAR ROSICLARE

Barges 500 tons Ohio River from our river loading station at Rosiclare.

Rail shipments from Rosiclare on Ill. Cent. RR

WASHED GRAVEL

HILLSIDE FLUOR SPAR MINES
38 So. Dearborn St. Phone: Ran. 1151
CHICAGO, ILL.

Here's why

CLEVELANDERS PREFER THE CLEVELAND ...AND WHY TRAVELERS AGREE WITH THEM •

★

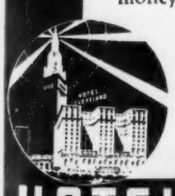
A genuine interest in your comfort by everyone from manager to doorman.

Food that has made our four restaurants famous.

Deep beds, crisp linen, modern furnishings planned for comfort.

Gay music for dancing, or calm quiet if you prefer.

Convenience that saves time and money. Hotel Cleveland adjoins the Union Terminal and Terminal Garage, and is next door to everything you'll want to see in Cleveland.



HOTEL CLEVELAND Cleveland

—Construction - Enterprise—

Massachusetts

SOUTHBRIDGE, MASS.—Water department, town hall, is making a survey for a sewage treatment plant to cost over $25,000. Greeley & Hansen Co., 6 North Michigan avenue, Chicago are engineers.

SPRINGFIELD, MASS.—Monsanto Chemical Co., St. Louis, plastics division, John C. Brooks, general manager, will build a new plant here for the manufacture of Resinox plastic molding. Construction is to be started as soon as plans can be drawn.

New Jersey

CLIFTON, N. J.—Standard Oil Co. of New Jersey has given contract to Arthur G. McKee & Co., Cleveland, for construction of two pipe stills at its Bayway plant, each of 32,000 barrels daily capacity.

Pennsylvania

CORRY, PA.—Aero Supply Mfg. Corp. will build a two-story plant addition to cost $40,000. F. Fuller, Commerce building, Erie, Pa., is architect.

DENBO, PA.—Vesta Coal Co., subsidiary of Jones & Laughlin Steel Corp., Pittsburgh, will build an unloading dock, including sheet steel piling, to cost about $50,000 C. W. Little, care Jones & Laughlin Steel Corp., Third and Ross streets, Pittsburgh, is engineer.

PITTSFIELD, PA.—Warren Electric Co-operative Inc., P. H. Curry, superintendent, will build 75 to 80 miles of electric transmission lines in Warren county, to cost about $60,000. Gibbs & Hill, Pennsylvania Station, New York, are engineers.

Michigan

DETROIT—Dorr-Patterson Engineering Co., 3362 Wight street, has been incorporated with $15,000 capital to build hydraulic machinery, by George N. Dorr, 4278 Alter road, Detroit.

DETROIT—Ace Lubricating Equipment Co. Inc. has been incorporated with 3750 shares no par value, to manufacture lubricators and automobile machinery, by A. Janisso, 2345 West Grand boulevard, Detroit.

DETROIT—Enterprise Drilling Machine Corp. has been incorporated with $50,000 capital to manufacture drilling machinery, by Lysle Hazen, 2731 Jerome avenue, Detroit.

DETROIT—Gairing Tool Co. plans erection of a $250,000 plant on Hoover road near Eight Mile road, construction to be started in 90 days. R. H. Neubrecht, Detroit, is architect.

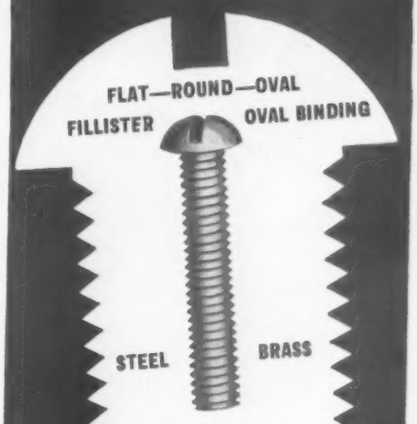
Illinois

CHICAGO—Bennett Mfg. Co., 14600 Princeton avenue, Steve Bennett, president, is opening a plant for manufacture of steel barrels and other steel containers at Harahan, La., a suburb of New Orleans. Equipment is designed for large-scale production.

CHICAGO—Brake Equipment & Supply Co. will build plant 100 x 220 feet, costing $65,000 at Sayre avenue and Sixty-sixth place, to afford larger capacity for production of air brake repairs.

CHICAGO—S. Obermayer Co., 2563 West Eighteenth street, is building two additional stories to plant at cost of $10,000. Company manufactures foundry supplies.

CHICAGO—Safety Socket Screw Corp., 4446 North Knox avenue, is building addition to increase production, at cost of $6000. Emil Larson, care owner, is architect.



MACHINE SCREWS and NUTS by Central

Standards from Stock ... Specials to Order

★ Famous for uniformity—ease of application and rigid holding power — Machine Screws and Nuts by Central will speed assemblies—will reduce your costs.

Equally important—*delivery*. Standard Machine Screws and Nuts in steel and brass—one or a million—are ready at Central Screw Company for same-day shipment upon receipt of your order.

Type 16
Special Low Wings

PATENTED
U.S. Patent 1,773,146

WING NUTS

Type 3
Standard Pattern

by CENTRAL

•

LOW PRICED

Type 14
Special Broad Base

Carried In Stock for Immediate Deliveries and BIG SAVINGS

You need no longer postpone using wing nuts to improve your product.

Wing Nuts by Central cost less—as much as 23% less—made by the exclusive Central Screw process.

Send for samples on your letterhead now. No cost or obligation.

Write for Catalog "S" Today!

CENTRAL SCREW COMPANY
3517 SHIELDS AVENUE
CHICAGO • ILLINOIS

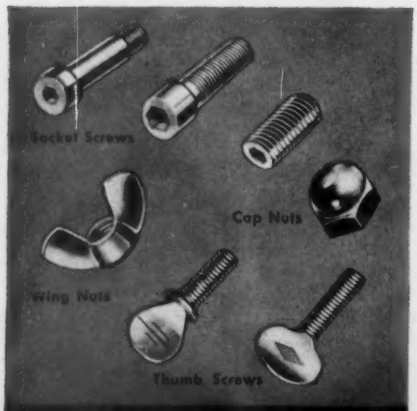
I BUY ON QUALITY AND PERFORMANCE

I BUY ON PRICE

We both get what we want in PARKER-KALON Cold-forged Products

MANUFACTURED by an improved process developed by Parker-Kalon, these superior *cold-forged* Socket Screws, Wing Nuts, Cap Nuts and Thumb Screws excel in the accuracy, uniformity and strength that critical users insist on. And yet, because of Parker-Kalon's unmatched production facilities, they *cost no more* than ordinary products! Write for free samples and prices. No obligation.

PARKER-KALON CORPORATION
194-200 Varick Street New York, N.Y.



PARKER-KALON
Cold-forged
SOCKET SCREWS WING NUTS
CAP NUTS THUMB SCREWS
SOLD ONLY THROUGH REPUTABLE DISTRIBUTORS

—*Construction and Enterprise*—

HUTSONVILLE, ILL.—Central Illinois Public Service Co., 607 East Adams street, Springfield, will build a power plant costing $500,000. Sargent & Lundy, 140 South Dearborn street, Chicago, are engineers.

JOLIET, ILL.—Union Machinery Co., manufacturer of bakery equipment, is building a one-story machine shop addition to cost $20,000.

Indiana

EAST CHICAGO, IND.—United States Gypsum Co., 300 West Adams street, Chicago, will build a one-story plant addition 50 x 200 feet.

INDIANAPOLIS — Indiana Machine Corp., 23 East Ohio street, has been incorporated by William G. Sparks, same address, with 500 shares no par value, to manufacture machinery.

INDIANAPOLIS—Vonnegut Hardware Co., F. Vonnegut, president, 120 East Washington street, will build a two-story addition 160 x 240 feet at Maryland and Mississippi streets, costing $190,000. General contract has been let to Guepel Construction Co., 923 Hume-Mansur building, Indianapolis.

WEST TERRE HAUTE, IND.—Central Indiana Power Co., F. C. Cour, purchasing agent, Traction building, Indianapolis, is building a one-story 140 x 140-foot hydroelectric power plant addition. General contract has been awarded J. L. Simmons Co. Inc., 719 Union Title building, Indianapolis. Cost is estimated at $100,000.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids as follows: June 7, schedule 1724, six motor-driven sensitive drilling machines for Puget Sound, Wash.; schedule 1728, one motor-driven punch and shear for Mare Island, Calif.; schedule 1744, one motor-driven universal grinder for San Diego, Calif.; schedule 1768, four motor-driven centrifugal pumps, spare parts and tools, for Puget Sound, Wash.; schedule 1748, two motor driven centrifugal pumps and spare parts for San Diego, Calif.; June 4, schedule 1755, one motor-driven reamer and cutter hob sharpening machine for Washington; schedule 1769, three diesel engine driven generators and spare parts for Philadelphia; June 11, schedule 1750, seven motor-driven hydraulic bending and straightening presses for Brooklyn, N. Y.

Kentucky

LOUISVILLE, KY.—Buckeye Cotton Oil Co. will build plant to double capacity. $35,000 for building, $40,000 for equipment. Includes one-story warehouse 64 x 120 feet, extraction building three-story 36 x 64 feet and six-story 36 x 47 feet. R. B. Scherr is superintendent.

Florida

ORLANDO, FLA.—Orlando Aviation Industries Inc. has given contract to Kiehl & Stevens for $30,000 aircraft plant to be leased to Monocoupe Aircraft Corp., Clare W. Bunch, president, St. Louis. Building will be 150 x 150 feet.

Louisiana

LAKE CHARLES, LA.—Continental Oil Co., Ponca City, Okla., has plans nearly ready for bids for refinery here to cost $4,000,000.

West Virginia

HUNTINGTON, W. VA.—Appalachian Power Co. will install new boiler at plant at Kenova, W. Va., with 20,000 horsepower, increasing capacity from 35,000 to 50,000 kilowatts. Total cost about $260,000. Combustion Engineering Co., New York, has contract.

HUNTINGTON, W. VA.—International Nickel Co. New York, will build additions to house metallurgical and physical testing equipment and car-type electric heat treating furnace.

Missouri

NEVADA, MO.—City, Lynn M. Ewing, mayor, will vote soon on bonds to finance municipal light plant and distribution system costing $450,000. William Span, Interstate building, Kansas City, Mo., is consulting engineer.

ST. LOUIS—Chapman Knives & Saws Inc., 504 South Broadway, has bought site for erection of additional capacity.

ST. LOUIS—Preliminary plans have been approved for bridge across the Mississippi in St. Louis county, costing $3,500,000, wire cable construction. Sverdup & Parcel, St. Louis, are engineers for county court, in charge.

WAVERLY, MO. — Waterworks and sewage project to cost $100,000 has been approved by WPA; bids soon. Harrington & Cortelyou, 802 Dwight building, Kansas City, Mo., are consulting engineers.

Wisconsin

MILWAUKEE — Wisconsin Electric Power Co., 231 West Michigan street, will build a one-story 98 x 110-foot power plant addition costing $225,000. General contract has been let to Bentley Construction Co., 4022 North Port Washington road. (Noted May 6.)

Minnesota

MINNEAPOLIS — Electric Radiator Corp., 1153 Sixteenth avenue, S. E., has been organized to manufacture portable electric heaters.

ST. CLOUD, MINN.—Northern States Power Co., 15 South Fifth street, Minneapolis, will build new electric generating station 60 x 120 feet costing $600,000, including 7500-kw. steam-driven generator and boiler. H. H. Watson, Minneapolis, is construction superintendent.

ST. PAUL—Thermal Co., manufacturer of automatic heating controls, 2434 University avenue, H. W. Small, president, plans construction of a one-story factory addition. Toltz, King & Day Inc., Pioneer building, is architect.

THIEF RIVER FALLS, MINN.—City, P. G. Pederson, clerk, takes bids to June 3 on electric generating unit of 1600 to 2050 horsepower, two cycle. Ralph D. Thomas & Associates, 1200 Second avenue South, Minneapolis, are consulting engineers.

Texas

TEXAS CITY, TEX.—Carbide & Carbon Chemicals Corp., 30 East Forty-second street, New York, has bought an additional ten-acre tract for future expansion.

Kansas

ELLSWORTH, Kans. — Morrison-Knutsen Co., Boise, Idaho, is low bidder on outlet tunnel for Kanapolis dam on Smoky Hill river. Bids to United States engineer's office Kansas City, Mo., Capt. A. M. Neilson, district engineer. Electrical and mechanical equipment will be required for intake tower and operating house.

Nebraska

OMAHA, NEBR.—Cudahy Packing Co. is taking bids for a five-story packing

SCREENS
of Perforated Metal

The Harrington & King PERFORATING Co.

5634 Fillmore St., Chicago, Ill.
New York Office—114 Liberty St.

INDUSTRIAL FURNACES

OVENS and DRYERS
BURNER EQUIPMENT

PENNSYLVANIA INDUSTRIAL ENGINEERS

2413 W. Magnolia St., N. S., Pittsburgh, Pa.

STEWART
INDUSTRIAL
FURNACES OF ALL KINDS
Chicago Flexible Shaft Co., 1106 S. Central Ave., Chicago, U. S. A.
Canada Factory: 321 Weston Rd., S., Toronto • New York Office: 11 W. 42nd St., N.Y.

Simonds QUALITY *Gears*

The first SIMONDS gear was cut in 1892; today we cut spur gears over 12 feet in diameter as routine business. We make all types of quality gears of cast and forged steel, grey iron, bronze, aluminum and monel metal—also, of silent steel, rawhide and bakelite. Send your next gear inquiry to

THE SIMONDS GEAR & MFG. CO.
25TH STREET, PITTSBURGH, PA.

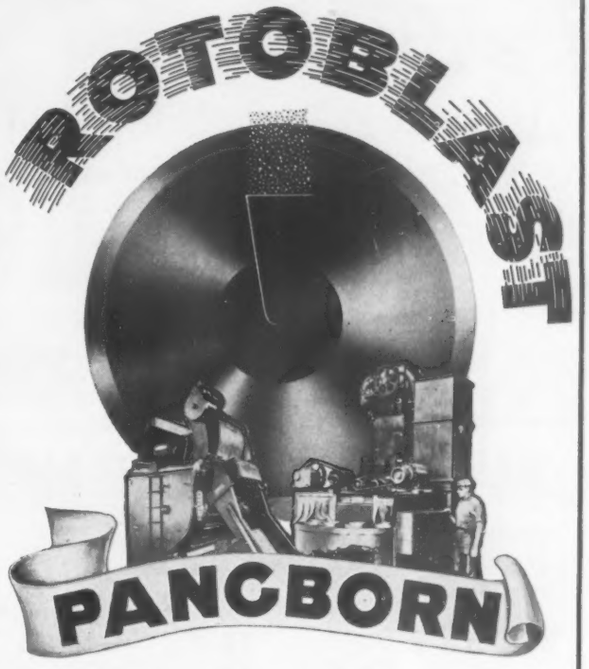
Pickling of Iron and Steel

—By Wallace G. Imhoff

Price Postpaid $5.00

This book covers many phases of pickling room practice and construction and maintenance of pickling equipment.

THE PENTON PUBLISHING CO.
Book Department
1213 W. 3rd St. **Cleveland, O.**
429-S



A New Day Dawns to

CUT YOUR CLEANING COST

Behind the rising popularity of Pangborn Blast Cleaning Tables, Barrels and Special Machines, is the solid satisfaction and perfection of the ROTOBLAST.

The ROTOBLAST gives you a fast and efficient blast cleaning unit that economically removes scale, dirt and sand from big and little castings by centrifugal force . . . eliminating the need for compressed air.

The Pangborn ROTOBLAST has no useless parts to wear, no elaborate assembly to add to its maintenance. It is a true precision unit, smooth running at its maximum 2400 RPM, and develops a superior striking power by its elimination of an impeller in the abrasive path from feed center to the vanes.

The ROTOBLAST has been subjected to every test . . . and comes up with unusual distinction. Industry recognizes this triumph and today awards Pangborn by placing more and larger orders for Pangborn Barrels, Tables and Special Machines than ever before in our history.

The ROTOBLAST DAY has dawned. Let us point out its features for you. Send for new Bulletin No. 212.

PANGBORN

WORLD'S LARGEST MANUFACTURER OF BLAST CLEANING AND DUST CONTROL EQUIPMENT

PANGBORN CORPORATION • HAGERSTOWN, MD.

and canning plant to cost about $250,000, from plans by company's engineering department, 221 North LaSalle street, Chicago.

Iowa

ALGONA, IOWA—City, Adah Carlson, clerk, plans light and power plant. Burns & McDonnell Engineering Co., Kansas City, Mo., engineer, has reported two plans, for enlargement of present plant or construction of new plant costing $250,000, including site and new diesel engine.

WATERLOO, IOWA—John Deere Tractor Co., L. A. Rowland, general manager, plans construction of an addition to its tractor plant, 120 x 220 feet.

WIOTA, IOWA—Village, Carl L. Reed, clerk, takes bids to June 5 on equipment and materials for waterworks plant. Ralph W. Gearhart, 349 Twenty-first street, Cedar Rapids, Iowa, is consulting engineer.

Colorado

LAS ANIMAS, COLO.—City, Ted Dennison, city engineer, is making survey for power plant. E. T. Archer & Co., 609 New England building, Kansas City, Mo., are consulting engineers.

Montana

KALISPEL, MONT.—City, F. J. Robischon, clerk, considers construction of sewage disposal plant costing $53,000, as recommended by state board of health.

California

LOS ANGELES — Fletcher Aviation Corp. has been incorporated with $2,000,000 capital. Albert Launer, Fullerton, Calif., is representative.

LOS ANGELES—Pacific Aviation Inc. will build a one and two-story aircraft plant on five-acre site in Hawthorne, Los Angeles suburb, at cost of $40,000.

LOS ANGELES—Harris Steel Fence Co., 8635 South Main street, has been formed by Claerence D. Harris and associates.

SOUTH GATE, CALIF.—American Concrete & Steel Pipe Co. is building an addition to its plant at 4635 Firestone boulevard, 20 x 240 feet and 20 x 80 feet.

Oregon

SALEM, OREG.—John W. Cunningham, engineer, Portland, Oreg., is making survey for proposed $300,000 municipal sewage treatment plant.

Washington

OKANOGAN, WASH.—Graves Machine Shop, George Graves, manager, will build a machine shop 50 x 70 feet, with steel truss roof.

SEATTLE—Bids will be received June 3 by Swift & Co., Chicago, for a branch packing plant at 1051 Fourth avenue South, Seattle, of reinforced concrete, to cost about $175,000.

Canada

AMHERST, N. S.—Canadian Car & Foundry Co., 621 Craig street West, Montreal, will spend $25,000 on changes and improvements to plant here to enlarge aircraft production. L. A. Peto is general manager.

HAMILTON, ONT.—Cub Aircraft Ltd. will build plant at Hamilton airport, 100 x 120 feet. Company has leased another building near airport and taken option on additional ground for further expansion. Will produce Cub and Harlow aircraft.

LEASIDE, ONT.—Lincoln Electric Co. of Canada Ltd., 65 Bellwoods avenue, has let general contract to W. B. Sullivan, 30 Bloor street West, Toronto, for 100 x 300-foot plant. Mathers & Haldenby, 96 Bloor street West, architects.

TORONTO, ONT.—Atlas Engineering & Machine Co. Ltd., 28 Eastern avenue, is having plans prepared for plant to cost $50,000. W. L. Somerville, 30 Bloor street West, is architect.

DRUMMONDVILLE, QUE.—Canadian Celanese Ltd., R. H. Sperling, manager, has let contract to Stewart Construction Co. Ltd., 7 Dufferin street, Sherbrooke, Que., for an addition to cost $100,000 and company announces a second addition at same cost will be built at once.

MONTREAL, QUE. — International Business Machine Co. Ltd. will build a three-story plant from plans by Reginald C. Tetley, architect.

MONTREAL, QUE.—Canadian Car & Foundry Co. Ltd., 621 Craig street West, will build plant addition on St. Patrick street, to cost $50,000.

ROUYN, QUE.—McWaters Gold Mines Ltd., W. J. Hosking, manager, is having plans prepared for an addition to its mill, costing $70,000.

HANDLING COILS HORIZONTALLY

Something new in coil handling for magnetic or non-magnetic coils is now ready for general distribution after three years of trial in New England plants. It is a new

MANSAVER GRAB

(PATENTED)

fully automatic in operation. It is made adjustable so the same grabs will handle coils having a wide variation in internal and external diameters as well as widths.

Mansaver grabs have been built for coils ranging from 250 to 3500 lbs. in weight. It is handling brass, silicon steel, 18-8 stainless both high and low carbon steel. For complete information write.

J-B ENGINEERING SALES CO., 1743 Orange St., New Haven, Conn.

START OPERATIONS TOMORROW!

WE HAVE THE BUILDINGS—
Ranging From 1000 to 400,000 Sq. Ft.,—
With or Without Modern Cranes
Located

OHIO — W. PENNA. — INDIANA — MICHIGAN

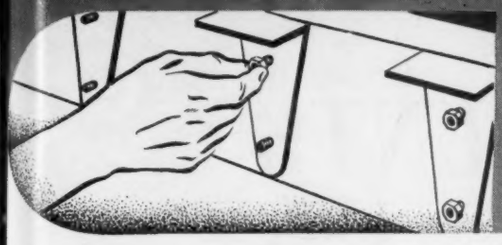
FINEST AVAILABLE BUILDINGS—
PRICED REASONABLY—GROUND IS DONATED

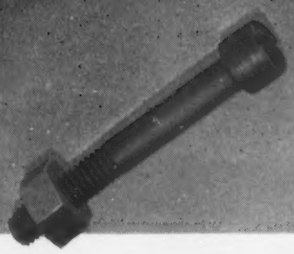
To anyone looking for new or additional plant locations, considerable cooperation from communities can be arranged.

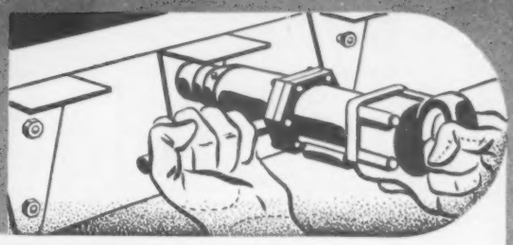
To those needing additional buildings to be erected at their present plants, we offer a large selection of modern buildings and cranes (spans up to 115').

HETZ CONSTRUCTION CO. INC.

Griswold St. N.E. WARREN, OHIO Phone 4474







TIE UP WITH UPSON

and avoid assembly tie-ups

EASY TO ASSEMBLE

You won't experience delays and tie-ups in assembly due to off-size bolts and slow-fitting threads when you use Republic Upson headed and threaded products. These bolts and nuts are made for fast assembly.

Shanks are highly accurate to size — permitting bolts to slide through holes without difficulty. The first bolt tried always fits. There is no need to reach for a second bolt and no reaming.

Because threads are clean and sharp, nuts go on with ease. Bolt heads and nuts are full size. Wrenches fit snugly — prevent slippage.

The next time you need headed and threaded products, order Republic Upson — and see for yourself how well your workmen like them and how they keep assembly work moving.

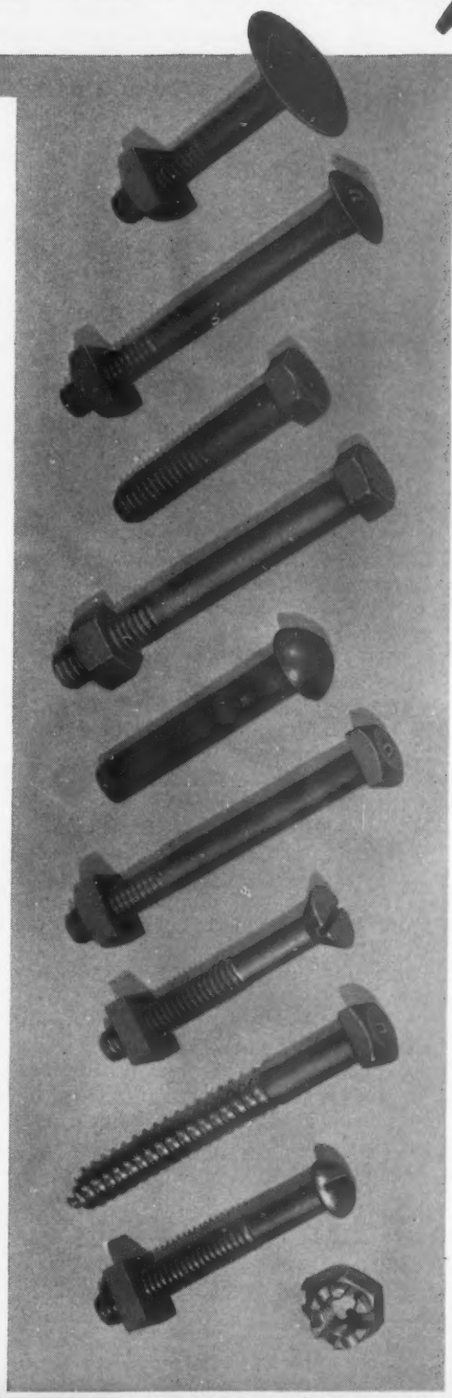
Tie up with Upson — it pays in many ways.

• • •

Write for a copy of Catalog No. 307. It will bring you sizes, weights, specifications and other information on the Republic Upson line. Republic Steel Corporation, Bolt and Nut Division, Cleveland, Ohio.

REG. U. S. PAT. OFF.
REPUBLIC STEEL

BERGER MANUFACTURING DIVISION
NILES STEEL PRODUCTS DIVISION
STEEL AND TUBES DIVISION
UNION DRAWN STEEL DIVISION
TRUSCON STEEL COMPANY



STRONG AND TOUGH

Since the purpose of bolts, nuts and rivets is to hold materials together, with provision for easy dismantling when repairs may be necessary, they must be strong and tough. That Republic Upson headed and threaded products may possess these requisites in needed degrees, Republic produces its own steel processed specifically for bolt making.

Throughout every step of manufacture — from the blast furnace to the final heat treatment — Republic metallurgists check and double-check the qualities of the steel as it moves from operation to operation.

Thus, if your use necessitates a definate strength, toughness or hardness, all you need to do is specify your requirements on your order for Republic Upson bolts and nuts. When you receive the shipment, every item will meet your specifications.

REPUBLIC

UPSON

HEADED AND THREADED PRODUCTS

OTHER REPUBLIC STEEL PRODUCTS FOR INDUSTRY

Alloy and Carbon Steels, Enduro* Stainless Steel, Republic Double Strength Steel, Toncan* Copper Molybdenum Iron, Pig Iron, Sheets, Strip, Bars (Hot Rolled and Cold Drawn), Pipe, Tubing, Boiler Tubes, Roofing, Wire, Fencing, Conduit, Bins, Shelving, Cabinets, Lockers, Standard Steel Buildings

*Reg. U. S. Pat. Off.

Reader COMMENTS

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Must Have Realistic View

To the Editor:

It has become painfully apparent, during the last few months, that the weight of dollars in an armament program can, and does, in the beginning, exercise the beneficial effect of the weight of dollars no matter where this weight be applied. Hitler is credited with spending 37 billion dollars on his three-year preparedness program. England and France, combined, have spent only about two-third this amount, and you are probably familiar with the extent of the American armament budget during the last two or three years, there having been much talk in the papers about our stupendous war-time program, which all has been less than one and one-half billion dollars per annum.

Warfare having become mechanized to the obvious extent which now applies, there is more of a direct relationship between the dollars which must be expended and the results which must be obtained. In other words, the day of cheap victories, bought by blood and sacrifice and low dollar expenditures, is past, and while the sacrifice part of the business still applies, the dollar commitments are inescapable.

If these points are accepted, then the President's request for another one and a half billion dollars probably represents the maximum which he thinks can be spent quickly, but actually, we know, it is probably not more than three or four percent of the amount which we will have to lay out quickly in an endeavor to catch up with the mechanization program of our probable enemies. In other words, it is not outside the bounds of possibility that it may take a fifty-billion dollar program adequately to protect the interests of the richest country in the world, which, at the moment, lacks sufficient anti-aircraft guns to defend a city the size of Harrisburg, Pa.

If I understand your proposal correctly, you propose to extract this huge sum of money in terms of cash from the pockets of the people at large and while I think the motive is commendable, I think the proposal (see editorial entitled "Let's Pay it in Cash," in STEEL, May 20, p. 40) is impractical, unfair and, to a large extent ridiculous. Why? Because no generation which fights a war ever benefits from it, and if there are any economic benefits from a war, these benefits are enjoyed by the second, third, fourth generations afterwards. These generations are the ones who should pay for it.

If the scheme which is proposed in your editorial, i.e., to pay cash and to limit the preparedness to that which can be accommodated on a cash basis, goes through, then we have but little preparedness, and that is too great a risk for either you or me to take at this time. That is, providing you do not want to stand on the sidewalks every time a band comes down the street, raise your right hand to the inclined position and say "Heil"; to have your young women sent off to labor camps to act as breeders for cannon fodder; to forever forego the privilege of owning private property; to lose your independence, forever, as an individual and to become a minute cog in a mighty wheel of state operation, with no more control over your own destinies than the proverbial butterfly on the wheel.

All the foregoing boils down to but one simple piece of advice, i.e. Mr. Babbitt's philosophy in this day and age is not good enough. The geography of Main street does not extend, geographically, beyond Main Street. We are in a world situation, hence we need to get our heads out of the clouds and our feet on the ground. In other words, we need to become realistic.

R. E. W. HARRISON

Vice president,
Chambersburg Engineering Co.,
Chambersburg, Pa.

Wants Broader Tax Base

To the Editor:

I heartily concur with your editorial, "Let's Pay it in Cash," in STEEL, May 20, and sincerely hope that Washington will handle the expense on a cash basis, although I doubt if this will be done on account of its being election year. I personally would like to see the income tax bracket lowered to $500 for single persons and $1500 for married persons, to pay for this national defense program.

By so doing it would bring home to all the people the problems that go with the national defense program and I believe it would tend to create, as a result, more interest in what has got to be done.

A. E. SHELTON

President,
Menasco Mfg. Co.,
Los Angeles.

Let's Get it Over Quickly

To the Editor:

I have read with much interest the editorial "Let's Pay it in Cash," in STEEL, May 20 and agree with you 100 per cent in your views.

If we have a painful duty to perform let's do it and get it over with as soon as possible.

W. T. READ

President and treasurer,
Morse Twist Drill & Machine Co.,
New Bedford, Mass.

Vol. 106, No. 23, June 3, 1940, issue of STEEL, published every Monday at Cleveland, O. Entered as second-class matter at the postoffice, Cleveland, O., under act of March 3, 1879. U. S. and Canada, 1 year $4; 2 years $6; foreign countries, 1 year $10; Current issues, 25c